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Building the Business Case for Clinical Nurse Leader Integration into a Hospital Staffing Model

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Abstract

The Clinical Nurse Leader (CNL) is a newer role in the nursing profession. This generalist Registered Nurse (RN) role was designed to help address fragmented healthcare delivery and care coordination, emphasize and facilitate evidence-based practice, and improve patient quality outcomes at the microsystem level (AACN, 2011). This paper describes a Doctor of Nursing Practice (DNP) project that took place from January through December 2017 focused on making the business case to incorporate CNLs into a hospital staffing model. The CNLs focused on reducing hospital acquired infections (HAIs). The CNLs' work reduced HAIs by 48% in 2017 as compared to 2016 thereby saving the hospital nearly $385,000 in unreimbursed clinical care. Based on this project's outcomes, four full-time CNL positions were approved for 2018.

Keywords: Clinical Nurse Leader, CNL, quality improvement, quality outcomes, process improvement, hospital acquired infections, Clostridium difficile, C. diff, catheter associated urinary tract infection, CAUTI, central line blood stream infection, CLABSI.

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The Clinical Nurse Leader (CNL) is a newer role in the nursing profession. This generalist Registered Nurse (RN) role was designed to help address fragmented healthcare delivery and care coordination, emphasize and facilitate evidence-based practice, and improve patient quality outcomes at the microsystem level (AACN, 2011). There are now approximately 3,000 CNLs across the country, however not all are practicing in formal CNL roles (Bender, Williams, & Su, 2016). Because the CNL role has not yet been fully adopted in all healthcare settings nationally, it is difficult to quantify the impact of the role as it was designed.

Section II: Introduction

In 2007, the American Association of Colleges of Nursing (AACN) published a whitepaper recommending the development of a new nursing role. This new role, the Clinical Nurse Leader (CNL), was created in response to several recommendations from healthcare advocacy and advisory organizations such as the Institute of Medicine, The Joint Commission, American Hospital Association, and the Robert Woods Johnson Foundation (American Association of Colleges of Nursing [AACN], 2007). These organizations called attention to the need to address shortfalls in the healthcare setting, including: the high number and cost of medical errors, a fragmented healthcare delivery system, the misuse of healthcare resources, healthcare professional education more focused on providing patient-centered care, and concerns of a looming nursing shortage (AACN, 2007).

Universities and their practice partners began educating CNLs shortly after the AACN whitepaper was published. The CNL is a new or experienced registered nurse prepared at a master's level of education. The CNL role is defined as a generalist that can be used in any microsystem healthcare setting with competencies focused on quality and outcomes

improvement, use of evidence-based practice (EBP), team management, and patient and staff education among others (AACN, 2007; Stanley et al., 2008). The implementation of the CNL role has not been widespread or fully accepted across clinical care settings, and outcomes related to CNLs have not been thoroughly studied because of the newness of the role (Bender, 2014; Stanton, Barnett, Lammon, & Williams, 2011). This presents an organizational change opportunity in the care delivery model focused on how to best strengthen the impact CNLs can have on microsystem quality, patient safety, patient satisfaction and nurse satisfaction outcomes.

In 2011, the Institute of Medicine (IOM) published "The Future of Nursing Focus on Education" brief that asserted 80% of the nursing workforce should be baccalaureate prepared by 2020 (IOM, 2011). One independent hospital and healthcare system with two hospitals responded to this by mandating that its RN workforce obtain a bachelor's degree or higher in nursing by 2020 (K. Richerson, personal communication, March 11, 2014). There are now several RNs from this institution who have returned to school and completed their Masters of Science in Nursing (MSN) with special training and certification focused on the role of a CNL. These CNLs are motivated to use their new knowledge and skills to help impact care in the organization's microsystems.

Problem Description

Many hospital acquired infections (HAIs) are preventable; they add to length of stay, mortality, and overall increased cost of care (Sacks, et al., 2014). HAIs such as central line blood stream infections (CLABSI) can cause an average of seven days increase in hospital length of stay (LOS) and can cost between $3,700 and $29,000 (Institute for Healthcare Improvement [IHI]: How-to-Guide: Prevent Central Line-Associated Bloodstream Infections, n.d.). Catheter associated urinary tract infections (CAUTI) can add hospitalization costs between $500 and

$3,000 (IHI: How-to Guide: Prevent Catheter-Associated Urinary Tract Infections, n.d.). Hospital acquired *Clostridium difficile* (*C. diff*) infections also add to LOS and are responsible for increased hospital costs in the range of $13,168 and $28,218 (Shah et al., 2016).

The project took place in the two hospitals of a Northern California healthcare system. The larger hospital has 132 beds with an average daily census over 100. Services provided at this facility are emergency, intensive care, acute care (step down, medical-telemetry, and medical-surgical levels of care), pediatric care, general surgery, and maternal/child care. Specialty services include trauma, neuro-surgery, cardio-thoracic surgery, vascular surgery, and neonatal intensive care. The organization's smaller hospital is 12 miles east of the larger hospital. It has 50 beds with an average daily census over 40. Services provided at the smaller hospital are emergency, intensive care, general surgery and acute care. Specialty services include oncology care and joint replacement orthopedic surgery.

The hospital organization saw an increase in quality and patient safety issues such as hospital acquired infections (HAIs) throughout 2016. The rates of the three HAIs, *C. diff*, CAUTI, and CLABSI were all at or above the Center for Disease Control (CDC) benchmarks. HAIs at these rates is not only financially costly to the organization, but is also not reflective of the organization's mission or strategic plan to provide excellent care to the community served. The actual rates, benchmarks, and cost of the 2016 HAIs is reflected in Appendix A.

Available Knowledge

PICOT Question. In microsystem nursing departments, does the use of CNLs compared to systems that do not employ CNLs affect nursing sensitive quality scores such as pressure ulcers, central line infections, falls, readmissions, and patient satisfaction over a one-year period?

Search Strategy. A review of literature was conducted using PubMed, Cumulative Index to Nursing and Allied Health Literature (CNAHL), and the Joanna Briggs Institute. Clinical Nurse Leader, CNL, nursing clinical outcomes, patient clinical outcomes, and implementation were all keywords used in different combinations to search the databases. Search limitations were for articles written in English between the years of 2006 and 2017. Articles of interest were those studies that focused on care outcomes and implementation of the CNL role in any healthcare setting. Articles that focused on entry level master's CNL graduates and CNL education models or education collaboratives between schools and practice environments were excluded along with articles about professional organizations endorsing the AACN's position on the CNL role. A total of 24 articles were applicable in helping answer the clinical PICOT question. Nine of the studies were included in the review of evidence. These articles are summarized in Appendix B with the evidence synthesized in Appendix C. Additionally, The John's Hopkins Nursing Evidence-Based Practice research evidence appraisal tool and non-research evidence appraisal tool were used to assign the strength of evidence and the quality rating of studies included in this appraisal (Dearholt & Dang, 2012).

Literature Review. The evidence supporting CNL impact on microsystem outcomes is compelling despite being classified as lower levels of evidence. CNLs have had an impact on clinical quality, patient safety, patient satisfaction, and cost of care outcomes. There are now over three thousand CNLs in the United States who are motivated to use their education and knowledge (Bender, Williams, & Su, 2016). Bender (2014) conducted a narrative review of literature related to CNL implementation and related outcomes research. Three quantitative studies were reviewed with only one relating to quality outcomes in a microsystem that included CNLs in the model of care. Seven qualitative studies were reviewed. CNL perceptions of their

integration into practice settings related to their educational preparation, microsystem leadership capabilities, and being integrated to their full education and competency were the main foci of the qualitative studies. Most outcomes of these studies reveal the CNL role has not been implemented using the full competencies outlined by the AACN, thus providing opportunities for the healthcare team to better understand the CNL role. Twenty-five narrative or case study reports of CNL implementation were reviewed, most with promising outcomes in microsystems that used CNLs (Bender, 2014).

Two studies evaluated the CNL impact on patient satisfaction. Eggenberger, Garrison, Hilton, and Giovengo (2013) used descriptive data from four CNL journal logs and cited positive outcomes from four journal entries. In a more global look at organizational data, the authors attributed the CNL discharge phone call process to increased patient satisfaction scores for overall ratings by 17.5%, willingness to recommend by 4.4%, and patients' understanding of discharge information by 4.7% (Eggenberger et al., 2013). Bender, Connelly, Glaser, and Brown (2012) designed a short, interrupted time series to examine ten months of patient satisfaction data pre-CNL implementation and 12 months post-implementation. The study was done on one 26 bed progressive care unit as the intervention unit while having a similar unit as a control unit. The results showed statically significant improvements as evidenced by p values $<.05$ in all patient satisfaction categories measured on the intervention unit while there were no significant changes on the test unit (Bender et al., 2012).

Improved clinical outcomes have been attributed to CNL implementation in various microsystems. Two organizational quality improvement articles articulate CNL interventions that were implemented in several practice settings that impact clinical outcomes such as: length of stay, readmissions, pressure ulcers, vaccination, venous thromboembolism (VTE) prophylaxis,

surgical and interventional procedure cancellations, and blood utilization (Hix, McKeon, & Walters, 2009; Wilson et al., 2013). Hix et. al. (2009) reviewed outcome data three months prior to and three months after CNL implementation with the most impactful outcomes being a 10% reduction in GI lab cancellations, a 20% decrease in post knee replacement blood transfusions and, a 28.6% increase in VTE prophylaxis with CNL focused interventions. Wilson et al. (2013) discussed their six-year journey in implementing the CNL role throughout their organization, the clinical outcomes that were achieved, and quantified the financial savings attributed to CNL interventions at over $2.5 million.

One qualitative study used the CNL Transition into Practice Questionnaire to evaluate 24 CNLs' perceptions of: their role introduction, challenges to role implementation, positive aspects, healthcare team response, roadblocks to success, and role sustainability (Moore & Leahy, 2012). This article was unique in that it compared the current implementation of CNLs with the historical implementation of clinical nurse specialists (CNS). Notable outcomes from this study include only half of the CNLs stated that their role was implemented in a systematic way. Sixty-one percent of the CNLs perceived that nursing administrators did not support the CNL role and 82% of the CNLs felt they were improving quality of care in their microsystem (Moore & Leahy, 2012).

Bender et al. (2016) published a descriptive analysis of survey data focused on updating CNL workforce demographics and their accountability to the established AACN competency essentials for CNLs. While their sample respondents were mostly those RNs who progressed their education from a BSN to MSN/CNL, their analysis found that a high percentage of CNLs are RNs who have been in the workforce over 10 years. Most CNLs have a specialty certification and 71% are currently practicing in a CNL role. Growth of the role in dedicated

CNL practice is highest in the southern United States, highest in acute care hospital settings and CNLs, overall, are expanding at a rate of 64% per year. CNLs in formal CNL roles reported high levels of accountability to the AACN defined nine CNL essential competencies. The authors describe this as an important finding because it demonstrates there has been an increase in role clarity regarding CNLs than was previously reported (Bender et al., 2016).

In a more recent publication, Clavo-Hall, Bender, & Harvath (2017) conducted a systematic review of literature to gain insight on roles in which CNLs are currently practicing. A high percentage of CNLs are not working in formal CNL roles, but are in management, specialty care, and staff nursing roles. This shows there could be an opportunity to advocate for more dedicated CNL roles to improve quality and patient safety at the microsystem point of care delivery.

Finally, Harris and Ott (2008) authored an expert opinion article on writing a business case to advocate for the implementation of the CNL role in organizations. The authors advise that the building of a business case should include: relevant background information, a clear definition of the problem or opportunity, the objectives, the cost/benefit, pros and cons, and alternatives and consequences of not pursing the plan (Harris & Ott, 2008).

Despite having limited and lower level evidence studies, the patient care and quality outcomes in practice environments that integrate CNLs are encouraging. Research on CNL integration is in its infancy since the first CNLs only emerged from their MSN education after 2007. Additionally, the CNL role is not widespread in its implementation and there has been some role confusion with CNSs, CNLs being used in non-CNL roles, and non-CNLs being used as CNLs. Finally, it is difficult to directly link microsystem outcomes to CNL implementation

because of the potential impacts other process improvement initiatives may have on quality of care outcomes. This makes researching outcomes directly related to CNL implementation challenging.

Project Rationale

Change is inevitable in healthcare. Integrating new regulations, new evidence in care, new roles, and new technology are always in the forefront of healthcare organization management. Thus, organizations must attempt to continually learn, and always strive to be true learning organizations. Peter Senge's five disciplines of learning organizations model is useful in managing change and developing continuous learning organizations (Senge, 1990).

Senge's (1990) fifth discipline is systems thinking. This discipline is mentioned first because systems thinking is the basis of all the other disciplines as it stresses looking at how things interrelate and not their individual impact. Personal mastery, another of the five disciplines, "is the discipline of continually clarifying and deepening our personal vision, of focusing our energies, of developing patience, and of seeing reality objectively" (Senge, 1990, p. 7). This discipline suggests that individual learning and drive contribute to the whole of organizational learning (Fillion, Koffi, & Ekionea, 2015). Mental models are the discipline of being aware of one's self-understanding of the world, examining and communicating those thoughts, and having an openness to consider others' ideas (Senge, 1990). Shared vision is "the capacity to hold a shared picture of the future we seek to create" (Senge, 1990, p. 9). To be successful, shared vision must truly be created with contributions from all involved and not just approval (Fillion et al, 2015). Healthcare organizations, particularly Magnet ® designated hospitals, have seen how the emergence of shared governance structures result in a shared vision at all levels of an organization. The final discipline is team learning. Team learning fosters an

environment of team intelligence that far exceeds individual contribution. Teams that learn together "develop extraordinary capacities for coordinated action" (Senge, 1990, p. 10).

The five disciplines focus on continual learning, process improvement, and innovation. These disciplines align with the CNL competencies, training, and skills. Quality improvement, process improvement and human based outcomes such as staff satisfaction are all measurable outcomes CNLs can impact in microsystems.

Specific Aims and Project Objective

After reviewing current and pertinent literature related to CNLs and because there were several nurses on staff who were CNLs, it was determined that formally implementing the CNL role at the small community hospitals and healthcare organization would be the doctor of nursing practice (DNP) project of one of the organization's nursing directors enrolled in a DNP program. The project was approved as an evidence-based practice (EBP) quality improvement project as documented on the University of San Francisco's DNP Statement of Non-Research Determination Form (Appendix D). The aim of the project was to make the business case for integrating the CNL role into microsystem staffing models with specific effort on leveraging CNL competencies and skills to decrease HAIs. CAUTIs, CLABSIs, and *C. diff* were the focus HAIs. A year over year decrease of the three HAIs would be used to build the business case for further implementation of the CNL role throughout the organization. The project's terms and definitions are in Appendix E.

Section III: Methods

Context

The Centers for Disease Control (CDC) reports that on any given day, one of every 25 patients hospitalized in the United States will have a hospital acquired infection (HAI) (CDC

HAI Progress Report, 2016). HAIs are infections patients get while they are under medical treatment in a healthcare facility. These infections are a patient safety risk and add to the cost of healthcare. They are also largely preventable. While there has been improvement in HAIs since the CDCs HAI progress report in 2009, there is work yet to be done to get to a goal of having zero HAIs (CDC HAI Progress Report, 2016; IHI: What zero looks like: Eliminating hospital acquired infections, n.d.).

The current rate of CAUTIs, CLABSIs, and *C. diff* in the healthcare organization in Northern California placed it at high risk for patient safety, ethical, regulatory, financial, and legal exposure. Volumes and rates of HAIs were the same or increased in 2016 as compared to 2015. These HAIs are above the CDC National Healthcare Safety Network (HNSH) benchmarks. The estimated additional cost of care related to CAUTIs, CLABSIs, and *C. diff* in the organization totaled $1,384,000 in 2016, down slightly from $1,440,352 in 2015. See Appendix A for specific detailed information of the 2015 and 2016 HAI rates and costs.

In addition to the cost of HAIs to healthcare systems, there are risks to reputation. In July 2016, the Center for Medicare Medicaid Services (CMS) published its first quality star rating of each hospital. The star ratings are a one star (worst) to five-star (best) rating system that publicly conveys the quality of care hospitals provide based on 64 CMS measures (Whitman, 2016). Hospital acquired CAUTIs, CLABSIs, *C. diff*, account for five of the eight safety of care measures that contribute to an organization's star rating (Medicare.gov: Hospital compare overall rating, n.d.).

The project site was rated two stars in both the July 2016 and December 2017 CMS star ratings which is not in alignment with its strategic plan or operational goals. The organization's

Chief Nursing Officer (CNO) supported and approved the pilot project of implementing the CNL role. The CNO's letter of support is in Appendix F.

Stakeholder analysis. CMS's star rating caught the attention of the organization's executives resulting in their full support of a team to investigate reasons for and develop interventions to address HAIs. A HAI steering committee was formed in late 2016. The steering committee conducted a stakeholder analysis to identify who should participate in the HAI improvement efforts and which HAIs impacted which departments. See Appendix G for the stakeholder analysis.

Project Intervention

The incidence of HAIs was spread throughout various nursing units. Therefore, a HAI workgroup was established including front line staff representatives from each of the stakeholder areas. CNLs have the education and skills to address the issues such as HAIs, therefore, nurses nationally certified as CNLs or those trained as CNLs were selected to represent each nursing service area: emergency (2 CNLs), intensive care (2 CNLs), the three acute care settings (1CNL each), and maternal-child (3 CNLs) on the HAI workgroup. Clinical Nurse Specialists (CNSs) for perioperative and critical care were also team members.

The HAI workgroup was tasked with helping the organization determine, at the microsystem level, what steps in its processes and practices were failing and how they contributed to the current undesired HAI outcomes. The CNLs on the HAI workgroup assessed the current situation related to CLABSIs, CAUTIs, and *C. diff*. Based on that assessment, they designed and implemented interventions to address the issues and then monitored and measured the outcomes of the interventions to evaluate their effectiveness in improving HAI outcomes. Additional measures, specifically the cost of additional care for each HAI was used to help the

workgroup understand the impact of these adverse events. HAI cost information and the cost of the CNLs were valuable to help quantify the CNL work.

Gap analysis of intervention. Prior to the development of the HAI workgroup, the Infection Prevention (IP) department had the primary responsibility for addressing HAIs. They attempted to gain assistance from department managers, but with several competing priorities, HAI incidents were often not reviewed or not reviewed quickly. Because of the delay, front line staff recollection and engagement to identify the contributing issues of each HAI was not helpful. Additionally, despite great intentions, the IP nurses were developing interventions to address HAIs that were not aligned with front line nursing or ancillary staff workflows.

Work breakdown structure. In organizing and navigating through the complexity inherent in implementing the CNL role in an organization, the use of project management concepts and tools were important. One tool used was the work breakdown structure (WBS). The CNL implementation project WBS is depicted in Appendix H. In the concept phase, a needs assessment included a review of literature to help define the problem, inform anticipated outcomes, and identify possible solutions. It also included introducing the idea with supporting evidence to stakeholder leaders and peers for buy-in. Support to move forward meant full project planning could begin. Building a business case for the pilot of the project was in the concept phase. With a robust project plan, the cost and number of full time equivalents were determined and budgeted. A review of the microsystems' current HAI outcomes, the cost of HAIs, and a review of literature demonstrating that CNLs have the potential to improve outcomes while reducing costs were used in presenting the business case for financial support of the project.

When approved, the project moved in to the design phase. In the design phase, specific workflows were determined. Work packages in this phase included developing job duties and workflows for CNLs on the HAI team. It was decided to use the established shared governance structure for managers and the CNLs. They collaboratively created specific workflows and measureable outcomes for the CNL role on the HAI work team. Additionally, as part of the shared governance process, CNSs were consulted for process input.

In the initial phase, the pilot microsystems were prepared. Key work packages included developing and delivering communication to all staff informing them of the reason for and the role of the CNL. Of equal importance, was the communication and setting of expectations with other departments and units about the CNL role. This ensured the proper utilization of the CNLs in the microsystems. Additionally, every other week check-in meetings with the HAI team CNLs and other identified stake holders were scheduled to review successes, barriers, risks, address issues, or adjust interventions was an important task in the pilot phase.

In the pilot stage of the implementation phase, results were evaluated. Anticipated outcomes were realized and the business case for further application of the CNL role was established, resulting in a plan for further roll out and use of CNLs. Several of the same summary tasks and work packages will be used when planning the formal system-wide implementation of CNL role into additional microsystems.

Project timeline. Project preparations started in September 2016 with project concepts such as reviewing the literature related to CNLs, discussing the project concept with organizational leaders, obtaining organizational and budget approval to pilot the CNL role in the organization, and deciding the area of focus for the CNL pilot. Selecting HAIs for the CNL team to focus on, developing the job description/job duties for team members, identifying CNLs to be

on the team and other project design efforts were ongoing through January 2017. The goal was to have the team formed and working on HAI reduction strategies starting in February 2017.

Routinely, the organization's budgeting process begins in August each year. The fiscal year aligns with the calendar year. By starting the pilot in February, outcomes and cost savings from February through July were available to develop a business case for full rollout of CNLs in the organization starting with the 2018 budget. A detailed timeline of the project is depicted on a GANTT chart in Appendix I.

SWOT analysis. A strengths, weaknesses, opportunities, threats (SWOT) analysis was completed and determined that CNLs could play a viable role in piloting several interventions addressing the HAI issue. Strengths included the several RNs already certified or trained as CNLs. Additionally, the organization is a Magnet ® designated institution and has robust point of care EBP resources for CNLs and workgroup members to access easily. Weaknesses included the organization's lack of a plan to use its corps of trained CNLs. Opportunities included being able to maximize the training and education of several RNs in the organization and help in spreading improvement work to several departments and shifts. Another opportunity was to improve EPB and the use of the available point of care EBP tools. Threats included the potential attrition of CNLs to other employers since there were no formal professional opportunities for within the organization. Finally, if HAIs continued at the 2015 and 2016 rates, there was a threat of the organization not meeting Magnet ® re-designation criteria. The SWOT analysis is detailed in Appendix J.

Budget/return on investment. Many HAIs are preventable; they add to length of stay, mortality, and overall increased cost of care (Sacks et al., 2014). Hospital acquired infections such as central line blood stream infections (CLABSI) minimally add $3,700 of unreimbursed

care to a hospital stay (IHI: How-to Guide: Prevent Central Line-Associated Bloodstream Infection, 2012). Catheter associated urinary tract infections (CAUTI) can add hospitalization costs of $1000 (Institute for Healthcare Improvement: How-to Guide: Prevent Catheter-Associated Urinary Tract Infection, 2011). Hospital acquired *C. diff* infections can contribute to an additional $13,168 of unreimbursed hospital care (Shah et al., 2016).

To help determine the cost/benefit of adding CNLs to the organization's staffing model to improve outcomes, a pilot workgroup, mostly comprised of CNLs, was formed to address HAIs. The CNLs assessed the current issues causing CLABSIs, CAUTIs, and *C. diff*. Based upon their assessments, they designed and implemented interventions to address the causes and then monitored and measured the interventions and evaluated their effectiveness in improving HAI outcomes.

As part of the pilot project, each CNL was allotted eight hours per pay period during the pilot year to meet with the workgroup and implement and measure appropriate interventions on their units. In the first half of 2017, the CNLs on the workgroup comprised 1.0 full time equivalent (FTE). The pilot's budget is detailed in Appendix K. The cost of the workgroup was more than the cost avoidance goal of a 20% reduction in each HAI category. The workgroup, and specifically the CNLs, were motivated to achieve greater than the stated goal to prove their worth to the organization.

Responsibility/communication plan. The CNLs identified to represent each microsystem on the HAI team were responsible to the DNP student/nursing director and the Director of Quality who were co-mentoring the workgroup. The workgroup team reports to the HAI steering committee made up of the Assistant Vice President of Nursing Operations, nursing

directors, and physician leaders. The organization's Quality Committee is the final authority of the project. Appendix L defines the data reporting structure with reporting intervals.

Study of the Interventions

The Institute of Healthcare Improvement (IHI) offers a framework model, IHI's Model for Improvement (Appendix M), the CNLs used in assessing the HAI problem and designing interventions. This model guided the improvement work the CNLs undertook and proved to be an important tool that kept the improvement work focused and organized. The improvement model includes an aim statement for the improvement effort. The plan, do, study, act (PDSA) wheel depicts an organized way of approaching individual improvement tactics (IHI: How to Improve, n.d.).

Measures

Defining measures and developing a plan to measure outcomes are critical components needed to evaluate whether actions taken to improve quality and patient safety make a difference. IHI recommends three types of measures: outcomes, process, and balancing. Outcomes measures are those measures that account for the system impact on patients' values and their wellbeing, in addition to, the impacts on stakeholders such as payers, employees, and the community. Examples of outcomes measures are mortality rate, length of stay, readmission rates, and infection rates.

Process measures are measures that evaluate if the system is accomplishing results as intended. These measures can help determine if policies and procedures are being followed. Examples of process measures are the percent of patients who have had a chlorhexidine (CHG) bath each day to help prevent CLABSIs and CAUTIs and handwashing compliance rates (IHI: Science of Improvement: Establishing Measures, n.d.). Practice measures are a form of process

measures but they focus on measures that evaluate how people are following established process. Examples of practice measures are an audit of nurses performing CHG bathing on patients or an audit of nurses performing a urinary catheter insertion to evaluate if they are following proper technique. Process and practice measures are symbiotic because they evaluate if the process is being followed while also evaluating if it is being done correctly. An example of this is a central line dressing change. Health record documentation can show that the dressing was changed at the appropriate time, but if the nurse did not maintain sterility during the dressing change, the patient would be at risk of developing a blood stream infection. Appendix N outlines several outcomes, and potential process, and practice measures that the CNLs considered as they focused on improving HAI outcomes.

IHI also recommends consideration of balancing measures to ensure that the improvement efforts in one area are not creating new issues in another area. An example of a balancing measure is paying attention to an increase in the readmission rate when there is a focused effort on decreasing length of stay (IHI: Science of Improvement: Establishing Measures, n.d.). For this project, there were no specific balancing measures identified. Practice metrics have a higher potential for limitations or difficulties related to data collection. Practice data were collected using a prevalence technique, defined as observation of caregivers completing the specific practice task on certain days. It relied on patients with central lines, urinary catheters, or *C. diff* being present on the unit on the scheduled days. Data collection tools based on the organization's policy and EBP were developed by the HAI team. These tools were built into the organization's electronic tool for front-line audit data collection. Collectively designing the audit tools for process and practice measures by a team primarily consisting of CNLs helped control for inter-rater reliability during the data collection process.

The CLABSI, CAUTI, and *C. diff* outcomes data is secondary data that is managed by the organization's infection prevention (IP) department. The IP department is notified of infections by way of the laboratory when a specimen tests positive for an infection. The IP team then reviews the electronic health record (EHR) to determine variables such as whether the infection is hospital acquired or community acquired, and if hospital acquired—which unit it is attributed to. The DNP student was notified by the IP team every time a hospital acquired CAUTI, CLABSI, or *C. diff* occurred.

Analysis

Outcomes data related to the HAIs were collated by the IP department and reviewed by the HAI team twice a month throughout the project. Quarterly benchmarked outcomes data were reviewed at the organization's Infection Control, Quality, and Medical Executive medical staff committees. Appendix O is an example of how the global outcomes data were displayed for committee meetings and disseminated to each unit in the organization. The process and practice measures needed a more dynamic data display. Each micro-system that the CNLs represent uses a quality improvement board located adjacent to the shift huddles location. Shift huddles are a quick, 10-minute huddle conducted by the charge RN during each shift to discuss any organizational updates, new information, current unit quality initiatives, and patient safety concerns so the team can respond accordingly to assist throughout the shift if needed.

The quality boards include space to monitor daily or weekly metrics for quality or process improvement initiatives. This board also serves as a dashboard for front-line staff to see how improvement efforts are working or not, so the team can make intervention adjustments. Appendix P is an example of how the quality boards were used as a dashboard for the HAI team to display outcomes, process, and practice data in their micro-system. The workgroup CNLs

were responsible for updating the quality boards and regularly reviewing outcomes and process/practice data with staff in huddles. Additionally, when an HAI occurred throughout the year, the CNLs were responsible for leading an immediate case review with appropriate staff. This case review was written up in a story format and reviewed at all huddles for several days (Appendix Q). These stories helped to engage front line staff in understanding the specific issues related to that fall out and recognize what they could do to change their practice immediately to prevent further fallouts. Case review stories, with no specific patient identifiers to protect patient privacy, were also placed on the quality boards.

Ethical Considerations

The goal of piloting the CNL role with a focus on decreasing HAIs was to prove that CNLs have the skills and competencies to effectively impact patient quality care and can financially contribute to the organization, essentially funding themselves. Melnyk and Fineout-Overholt (2015) define EBP as a "paradigm and lifelong problem solving approach to clinical decision making that involves the conscientious use of the best available evidence (including a systematic search for and critical appraisal of the most relevant evidence to answer a clinical question) with one's own clinical expertise and patient values and preferences to improve outcomes for individuals, groups, communities, and systems" (Melnyk and Fineout-Overholt, 2015. p. 604). Evidence based quality improvement (EBQI) is defined as "quality improvement initiatives based on evidence" (Melnyk and Fineout-Overholt, 2015. p. 604). Evidence was used in defining the CNL role and the pilot project. The latest evidence based practice guidelines were used for the quality improvement interventions to improve each of the three HAIs focused on in 2017.

Section IV: Results

Several interventions were implemented by the CNLs and the others in the HAI workgroup to improve HAI outcomes and help build the business case for permanent staffing of CNLs in organization microsystems. See Appendix R for a list of the HAI workgroup's interventions throughout the pilot year.

C. diff

The workgroup started the year focusing primarily on *C. diff* infections. *C. diff* had the highest prevalence and was the costliest of the HAIs, so it was chosen as the first HAI to address. The team conducted a root cause analysis of contributors to the high *C. diff* rate. They identified that physicians and staff not sending appropriate specimens for testing as the number one root cause issue. Physicians and RNs felt the existing algorithm decision tool on and the criteria for sending a *C. diff* test was too complicated and confusing. The first intervention was to convert the algorithm into a simpler checklist to be completed before sending any *C. diff* specimen to the laboratory for testing. Appendix S is the latest version of the *C. diff* collection checklist. Throughout the year, the audit tool was updated twice based on front-line staff feedback. Each time, use of the audit tool and changes were communicated at shift huddles.

The CNL's implementation of the *C. diff* specimen audit tool, focus on hand washing technique, educating on evidence based practice for doffing personal protective equipment, and high attention to cross contamination risks of patients, visitors, and objects moving in and out of *C. diff* room rooms were key efforts in reducing hospital acquired (HA) *C. diff* infections. By year's end, there was a 47% decrease in hospital acquired *C. diff* infections resulting in a cost avoidance of nearly $370,000 (Appendix T) and the rate of HA *C. diff* infections was below benchmark for three quarters in a row for both hospitals (Appendix U).

CAUTI

After conducting a root cause analysis and process and practice audits of CAUTIs, it was determined that there were several contributors to the high CAUTI rate. Some of these reasons included antiquated indwelling urinary catheter (IUC) insertion kits, lack of a nurse driven protocol for IUC removal, and lack of front-line RN knowledge on basic insertion practice. The CNLs on the HAI workgroup were integral in selecting an updated IUC insertion kit that was organized in segments to support sterile process during IUC insertion. The workgroup also advocated and gained support from senior leaders and supply chain representatives to add IUC alternatives into the supply chain. One of these additions was a female urinal. Having female urinals on hand could help decrease the need for an IUC at all or decrease the duration of an IUC. The CNLs created a series of huddle messages to educate RNs on best IUC insertion practices management of IUCs, and alternative urinary management tools to avoid use of IUCs. An example of a huddle message is in Appendix V. Additionally, all RN staff were retrained in IUC insertion using the new kits at the annual nursing skills fair. The CAUTI interventions resulted in a 25% reduction of CAUTIs through the year and cost avoidance of $5,000 (Appendix T). The rate of CAUTIs was below benchmark in the fourth quarter of 2017 (Appendix W).

CLABSI

C. diff and CAUTIs kept the workgroup busy throughout the year, so the organization's vascular access team suggested an assessment program offered by their main vendor of central lines. The vendor program was designed in a similar fashion using outcome, process, and practice measures to assess care of central lines. The assessment reviewed all current policies for central line care to ensure they aligned with the latest EBP. It also focused on assessing

nursing care related to central lines such as dressings applied appropriately and clean, dry and intact. The assessment also included simulation audits with RNS performing dressing change procedures, blood draw procedures, flush procedures, and hub maintenance procedures. These are all important steps to decrease the incidence of CLABSIs.

After the first vendor assessment in May, results were reviewed with the HAI workgroup who then created interventions. The team created a business case to change dressing change products. The central line product chosen is specific for each type of central line and has all specific and necessary supplies for that type of line. Each kit has two sub-kits included, one for removal of the old dressing and one with clean dressing supplies. Each kit is designed with small pockets that hold all the necessary supplies for each step of the dressing removal and redressing laid out in a stepwise manner. One nice feature of the kit is that it promotes hand hygiene between removing the old dressing and applying the clean dressing. The CNLs worked with the vendor and other unit champions to train over 90% of RN staff in the acute care units, the intensive care units, and the emergency departments in the new dressing change system. The vender returned in December to conduct a reassessment. The dressing change results of the two hospitals' assessment and reassessment are in Appendix X and Y.

There were many new RN staff that joined the organization between May and December. Some of the results could be because of new staff not being oriented thoroughly to the CLABSI reduction efforts. This is a weakness that is being addressed in ongoing CLABSI reduction efforts. Despite the results, there was a 25% reduction in CLABSIs in 2017 as compared to 2016 resulting in over $11,000 in cost avoidance (Appendix T) and CLABSIs were zero and below benchmark for the first time in the fourth quarter of 2017.

Communication of Efforts and Outcomes to Front-line Staff

Improving the communication of quality information to front line nursing staff is imperative as healthcare outcomes become increasingly transparent to the public. Nurses need real time, detailed information of quality issues and most want to engage in improvement work when they know and understand the facts. The Agency for Healthcare Research and Quality (AHRQ) Evidence-based Practice Center advocates for clear communication of evidence and outcomes that is tailored to the intended audience of healthcare providers (McCormack et al., 2013). The CNLs designed a quality board template they felt would best communicate HAI outcomes and improvement efforts to their front-line colleagues.

The quality board template included quality data presented to staff in a "high to low" format on the unit quality board. The "higher" level information is benchmarked data that is updated quarterly. Weekly incidence data for each quality indicator is displayed next, followed by more detailed information on active process interventions that should directly impact the quality outcome. Written case reviews of HAI occurrences were also shared. When there was an occurrence, the CNL(s) from the microsystem where the fallout occurred were responsible to immediately convene a team of front-line nurses, physicians, IP, pharmacy, lab, EVS and others to write the story of what caused the fallout. These case review stories were disseminated during huddles for several days so all staff had the opportunity to hear about the fallouts. Finally, front line staff improvement ideas were solicited, written, and displayed on the quality board. An example of *C. diff* quality board content is shown in Appendix O. Use of the quality boards and integrating a review of outcomes into huddles was key to engaging the front-

line staff in the improvement work. The CNLs listened to staff ideas for improvement and implemented several of the staffs' ideas.

Throughout the pilot, the number of HAIs were monitored daily. The year to date (YTD) data was provided weekly by the quality improvement department along with YTD information from the previous year. That data were quantified with nationally recognized costs for each HAI. The data was updated and shared with the CNLs and others on the HAI workgroup every other week at the workgroup meetings.

Section V: Discussion

The work by the CNLs and the HAI workgroup met the organization's goal of reducing HAIs. The work also yielded positive financial cost avoidance for all three HAIs. Since the organization's fiscal year aligns with the calendar year, the budget process for 2018 commenced in August 2017. At that time, a business case was proposed based on the HAI workgroup's efforts and outcomes. For the first half of 2017, the CNLs on the workgroup have comprised 1.0 full time equivalent (FTE). Because of the quality of their diagnoses of issues and the design of the interventions, the organization has seen a marked reduction of HAIs that saved it nearly $220,000 in the first half of the year and over $380,000 for all of 2017. The cost avoidance of HAIs from January through June 2017 were used to make the business case to add CNLS to the 2018 budget. The return on investment of the CNLs and workgroup for the first half of the year are detailed in Appendix AA.

Interpretation

The evidence and pilot project supports that CNLs can have a significant impact on microsystem outcomes and subsequent cost avoidance. It is the perfect role to help address quality and patient safety issues by utilizing the CNL competencies of expert clinician, outcomes

manager, educator, advocate, information manager, system analyst and risk anticipator, team manager, and lifelong learner (American Association of Colleges of Nursing, 2007). The CNL role reinforces the organization's commitment to Magnet ® designation and continuous organizational learning. Appendix AB shows the three-year return on investment of the CNLs using cost information from this pilot with additional foci for patient safety and cost avoidance such as falls, skin pressure injuries, and sitter utilization. These are all things a CNL can directly impact in their microsystem. The impact CNLs can have on patient safety, care outcomes, expenses and cost avoidance is staggering. Each year of CNL focused work on front-line quality improvement can result in a net savings of hundreds of thousands of dollars if quality improvement goals are met. In the future, cost savings per year may decrease because of reaching quality and patient safety goals and staying on target with providing excellent care. Based on the CNL led HAI workgroup pilot project results and the cost avoidance projections over the next three years, four CNL positions were approved in the 2018 operating budget.

One lesson learned was that trying to focus on improving three HAIs in one year is a huge undertaking. Each HAI turned out to be much more complex than anticipated. Because of this, the HAI workgroup and steering committee approved a collaboration with the organization's central line vendor to assist with the CLABSI assessment and intervention plan. The vendor's program aligned directly with the IHI model for improvement and the five disciplines of a learning organization. The CNLs were unit based champions, along with many other RNs from each microsystem, but the unit clinical managers and venous access team took the primary role in addressing the assessment and the main interventions for CLABSIs.

Limitations

The first limitation of this project was that only one unit could have a full-time pilot CNL in the actual CNL role. Because of budget constraints, it was not feasible to fully implement the CNL role in a 40-hour work week model. The compromise was developing the HAI workgroup with (mostly) CNLs and allowing them to work specifically on HAI assessments and interventions for eight hours per pay period. These CNLs juggled their clinical nurse positions and direct patient care with their CNL duties and focusing improvement efforts along with the rest of the HAI workgroup. Additionally, the workgroup became functional in January 2017. This turned out to be one of the busiest winters the organization has ever managed. It was a struggle to ensure the CNLs HAI workgroup time was preserved. It was very clear from the outset that the unit with the full-time CNL could complete the workgroup assignments and implement the interventions much more quickly than the other units.

Most of the units in the organization had certified CNLs to be on the HAI workgroup. Some units had RNs who had completed their MSN with a focus as a CNL, but the RNs had not taken their certification examination yet. There were a couple of units that wanted dual coverage on the HAI workgroup and both representatives were not CNLs or CNL trained. These RNs, however, were BSN prepared RNs and were highly motivated to improve HAI outcomes. Despite these limitations, the HAI workgroup and organization are very proud of the outcomes achieved and support was gained for the CNL role. Additionally, the professional growth and engagement in improvement work throughout the yearlong project was phenomenal to see in all the HAI workgroup members.

Conclusion

The CNL integration project took place from January-December 2017. Nine CNLs, along with other interdisciplinary team members, formed a HAI workgroup. The team was charged with decreasing hospital acquired C. diff, CAUTIs, and CLABSIs to help make the business case to integrate CNLs into the staffing model throughout the hospital. Throughout 2017, the team assessed root causes contributing to HAIs, designed interventions to address the HAIs, and evaluated outcomes related to the interventions. From January through December 2017, there was a 47% decrease in hospital acquired C. diff infections, a 25% decrease in CLABSIs, and a 25% decrease in CAUTIs as compared to the same period in 2016. The total cost avoidance of the three HAIs was nearly $385,000. The business case to incorporate CNLs into the microsystem staffing model was proposed to the Chief Nursing Officer during the organization's 2018 budget preparation using the HAI cost avoidance from January through June 2017. CNLs working on quality improvement for HAIs has been successful and further opportunities exist to improve microsystem quality of care. Because of this, four CNL positions were approved for the 2018 budget.

Section VI: Other Information

Funding

Funding for this pilot project to help make the business case for CNL integration into microsystem staffing was provided by the hospital and health system organization. No matter the structure, efforts to improve HAIs would have been undertaken anyway. The organization's leadership approved of forming the HAI workgroup with front line nursing representative being CNLs.

Section VII: References

American Association of Colleges of Nursing. (2007, February). White Paper on the Education and Role of the Clinical Nurse Leader.

American Association of Colleges of Nursing. (2011, March). The Essentials of Master's Education in Nursing.

Bender, M. (2014). The current evidence base for the clinical nurse leader: a narrative review of the literature. *Journal of Professional Nursing: Official Journal of the American Association of Colleges of Nursing*, *30*(2), 110–123. https://doi.org/10.1016/j.profnurs.2013.08.006

Bender, M., Williams, M., & Su, W. (2016). Diffusion of a Nurse-led healthcare innovation: Describing certified Clinical Nurse Leader integration into care delivery. *Journal of Nursing Administration*, *46*(7-8), 400–407. https://doi.org/10.1097/NNA.0000000000000365

Bender, M., Connelly, C. D., Glaser, D., & Brown, C. (2012). Clinical Nurse Leader impact on microsystem care quality. *Nursing Research*, *61*(5), 326–332. https://doi.org/10.1097/NNR.0b013e318265a5b6

Centers for Disease Control: Healthcare-associated infections (HAI) progress report (2016). Retrieved from https://www.cdc.gov/hai/surveillance/progress-report/

Clavo-Hall, J. A., Bender, M., & Harvath, T. A. (2017). Roles enacted by Clinical Nurse Leaders across the healthcare spectrum: A systematic literature review. Journal of Professional Nursing. https://doi.org/10.1016/j.profnurs.2017.11.007

Dearholt, S. L., & Dang, D. (2012). Evidence appraisal: Non-research. *Johns Hopkins Nursing Evidence-Based Practice: Model and Guidelines* (2nd ed., pp. 125–141). Indianapolis, IN: Sigma Theta Tau International.

Eggenberger, T., Garrison, H., Hilton, N., & Giovengo, K. (2013). Discharge phone calls: Using person-centred communication to improve outcomes. *Journal of Nursing Management*, *21*(5), 733–739. https://doi.org/10.1111/jonm.12100

Fillion, G., Koffi, V., & Ekionea, J.-P. B. (2015). Peter Senge's learning organization: A critical view and the addition of some new concepts to actualize theory and practice. *Journal of Organizational Culture, Communications & Conflict*, *19*(3), 73–102.

Harris, J. L., & Ott, K. (2008). Building the business case for the Clinical Nurse Leader role. *Nurse Leader*, *6*, 25,37–28,37. https://doi.org/10.1016/j.mnl.2008.06.002

Hix, C., McKeon, L., & Walters, S. (2009). Clinical Nurse Leader impact on clinical microsystems outcomes. *The Journal of Nursing Administration*, *39*(2), 71–76. https://doi.org/10.1097/NNA.0b013e318195a612

Institute for Healthcare Improvement: How-to Guide: Prevent Catheter-Associated Urinary Tract Infection. (n.d.). Retrieved January 2, 2017, from http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventCatheterAssociatedUrinaryTractInfection.aspx

Institute for Healthcare Improvement: How-to Guide: Prevent Central Line-Associated Bloodstream Infection. (n.d.). Retrieved from http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventCentralLineAssociatedBloodstreamInfection.aspx

Institute for Healthcare Improvement: Science of Improvement: Establishing Measures. (n.d.). Retrieved from http://www.ihi.org/resources/Pages/HowtoImprove/ScienceofImprovementEstablishingMeasures.aspx

Institute for Healthcare Improvement: What zero looks like: Eliminating hospital acquired infections. (n.d.). Retrieved from http://www.ihi.org/resources/pages/ImprovementStories/WhatZeroLooksLikeEliminatingHospitalAcquiredInfections.aspx

Institute for Healthcare Improvement: Model for Improvement. (n.d.). Retrieved from http://www.ihi.org/resources/Pages/HowtoImprove/default.aspx

Institute of Medicine: The Future of Nursing: Focus on Education Health and Medicine Division. (2011). Retrieved from http://www.nationalacademies.org/hmd/Reports/2010/The-Future-of-Nursing-Leading-Change-Advancing-Health/Report-Brief-Education.aspx

McCormack, L., Sheridan, S., Lewis, M., Boudewyns, V., Melvin, C. L., Kistler, C…Lohr, K. N. (2013). Communication and dissemination strategies to facilitate the use of health- related evidence. *Agency for Healthcare Research and Quality*. Retrieved from https://www.effectivehealthcare.ahrq.gov/ehc/products/433/1757/medicalevidence-communication-executive-131120.pdf

Medicare.gov. Hospital compare overall rating: Measures included by categories. (n.d.). Retrieved from https://www.medicare.gov/hospitalcompare/Data/Measure-groups.html

Melnyk, B., & Fineout-Overholt, E. (2015). *Evidence-Based Practice in Nursing & Healthcare: A Guide to Best Practice*. Philadelphia: Wolters Kluwer.

Moore, L. W., & Leahy, C. (2012). Implementing the new Clinical Nurse Leader role while gleaning insights from the past. *Journal of Professional Nursing: Official Journal of the American Association of Colleges of Nursing*, *28*(3), 139–146. https://doi.org/10.1016/j.profnurs.2011.11.010

Sacks, G. D., Diggs, B. S., Hadjizacharia, P., Green, D., Salim, A., & Malinoski, D. J. (2014). Clinical Science: Reducing the rate of catheter-associated bloodstream infections in a surgical intensive care unit using the Institute for Healthcare Improvement central line bundle. *The American Journal of Surgery*, *207*, 817–823. https://doi.org/10.1016/j.amjsurg.2013.08.041

Senge, P. (1990). *The Fifth Discipline*. New York, New York: Doubleday Currency.

Shah, D. N., Aitken, S. L., Barragan, L. F., Bozorgui, S., Goddu, S., Navarro, M. E., … Garey, K. W. (2016). Economic burden of primary compared with recurrent Clostridium difficile infection in hospitalized patients: A prospective cohort study. *The Journal of Hospital Infection*, *93*(3), 286–289. https://doi.org/10.1016/j.jhin.2016.04.004

Stanley, J. M., Gannon, J., Gabuat, J., Hartranft, S., Adams, N., Mayes, C., … Burch, D. (2008). The Clinical Nurse Leader: a catalyst for improving quality and patient safety. *Journal of Nursing Management*, *16*(5), 614–622. https://doi.org/10.1111/j.1365-2834.2008.00899.x

Stanton, M. P., Barnett Lammon, C. A., & Williams, E. S. (2011). The Clinical Nurse Leader: A comparative study of the American Association of Colleges of Nursing vision to role implementation. *Journal of Professional Nursing*, *27*(2), 78–83. https://doi.org/10.1016/j.profnurs.2010.09.014

Types of Healthcare-associated Infections | HAI | CDC. (n.d.). Retrieved from https://www.cdc.gov/hai/infectiontypes.html

Wilson, L., Orff, S., Gerry, T., Shirley, B. R., Tabor, D., Caiazzo, K., & Rouleau, D. (2013). Evolution of an innovative role: the Clinical Nurse Leader. *Journal of Nursing Management*, *21*(1), 175–181. https://doi.org/10.1111/j.1365-2834.2012.01454.x

Whitman, E. (2016). CMS releases star ratings for hospitals. Modern Healthcare. Retrieved from http://www.modernhealthcare.com/article/20160727/NEWS/160729910

Section VIII: Appendices

Appendix A

2015 and 2016 CLABS, CAUTI, and C. diff in the Organization

HAI	2015	2016
CLABSI Number	8	9
CLABSI Rate (number of CLABSI infections/1000 line days)	1.15	1.15
CLABSI Benchmark (NHSN mean)	0.9	0.9
Cost	$29,600	$33,300
CAUTI Number	7	15
CAUTI Rate (number of CAUTI infections/1000 urinary catheter days	0.89	1.35
CAUTI Benchmark (NHSN mean)	1.25	1.3
Cost	$7000	$15,000
C. diff	66	61
C. diff Rate/10000 patient days	15.9	12.77
C. diff Benchmark (NHSN per 10,000 patient days)	7.4	7.4
Cost	$869,088	$803,248

Note: Secondary data obtained from organization's infection prevention department.

Legend: CLABSI=central line associated blood stream infection, CAUTI=catheter associated urinary tract infection, C. diff=Clostridium difficile, NHSN=Center for Disease Control (CDC) National Healthcare Safety Network.

Appendix B

Evidence Evaluation Table

*IV=Independent Variable, DV= Dependent Variable
**Level and quality for each article based on JHNEBP Rating Scales

Citation	Concept-ual Frame-work	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Outcome Measures	Data Analysis	Findings	Level of Evidence	Quality of Evidence: Critical Worth to Practice
1. (Bender, 2014)	None	Narrative Literature Review	36 Articles	All CNL implemen-tation and research reports to date	25 implementation reports, 1 CNL job analysis, 7 qualitative survey studies, 3 quantitative studies	Literature review summa-rizing all CNL imple-mentation and re-search reports to date	One quantitative study addressed quality outcomes in a microsystem, others looked at nurse satisfaction and CNL leadership. Qualitative studies focused on CNL perceptions of integration into practice and use of education. Outcomes show opportunity to further integrate. Implementation reports revealed many positive patient and microsystem	Level 5= Literature Review	A=High -Thorough literature review -CNL role still very new -Further research needed on CNL influence on care delivery and outcomes in microsystems

							outcomes with CNLs.		
2. (Bender, Connelly, Glaser, & Brown, 2012)	None	Short interrup-ted time series	One 26 bed progres-sive care unit	IV: CNL implementation one intervention unit DV: Patient satisfaction scores	Patient satisfaction scores for 10 months pre CNL implementation and 12 months post CNL implementation	Nursing focused patient satisfaction scores: skill of the RN, RN kept you informed, attention to special needs, attention to requests	Statistically significant improvements in patient satisfaction on intervention unit from pre to post CNL implementation, no significant change from pre to post CNL implementation control unit	Level 2= Quasi-experimental	B=Good -CNL implementation and impact on quality largely untested -Adds to the body of evidence correlating CNL practice impacts on outcomes
3. (Eggen-berger, Garrison, Hilton, & Gioven-go 2013)	Boykin's and Schoen-hofer's theory "Nur-sing as Caring"	Descriptive data from CNL journals	Four specific journal exam-ples cited	IV: CNL-driven discharge phone calls DV: Patient satisfaction scores	Anecdotal case review from CNL journals	Several cases presented with prevented readmis-sions, avoidance of poor outcomes because of CNL intervention	In addition to positive case review outcomes, three patient satisfaction scores increased.	Level 5= Case study	B=Good -Relates CNL role and "ownership" of role to positive outcomes with discharge phone calls
4. (Moore & Leahy 2012)	None	Qualita-tive, descrip-tive research design	24 CNLs—partici-pant list from AACN 2009	IV: CNL demograph-ics including: age, CNL preparation, education background,	Themed partici-pant responses to: Role introduction, challenges to role implementatio	Open ended questions used for a qualitative content analysis. Themes reviewed	Role introduction—even split on whether it was systematic or not, Challenges to role implementation	Level 3= Qualita-tive	A=High -Useful comparisons to historical CNS implementation (lessons learned)

			CNL Summit	practice setting DV: Themes for implementing new CNL role	n, positive aspects, healthcare team response, roadblock to role success, role sustain-ability	and agreed upon by both researchers. Two independent CNLs not in study reviewed findings to verify finding were representative of their experiences.	—52% lack clarity of role and 43% overburdened, Positive aspects—82% felt improving quality of care, Healthcare team response—77% positive reception from RNs and 100% positive physician reception, Roadblocks—61% nurse administrators not supportive, Role sustainability—52% need responded need more nurse leader support		-Useful themes to pay attention to for those who are implementing CNL role
5. (Hix, McKeon, & Walters, 2009)	John Kotter's Change theory	Organizational quality improvement	Five clinical settings in VA Tennessee Valley Healthcare System	IV: CNL implement-ation in various clinical settings DV: Clinical outcomes	Ambulatory surgery—cancelled surgeries, Surgical inpatient unit—post TKA blood transfusions, GI lab—missed opportunities,	Quality outcome data from the microsystems 3 months before and 3 months after CNL imple-mentation	Ambulatory surgery—cancelled surgeries decreased by 2%, Surgical inpatient unit—post TKA blood transfusions decreased by 20%, GI lab—missed	Level 5= Organiza-tional Experience	A=High -applicable practice settings reviewed -applicable and interesting quality data monitored in each practice setting

					Surgical ICU—VTE prophylaxis, Transitional Care Unit—restorative dining partici-pation		opportunities decreased by 10%, Surgical ICU—VTE prophylaxis increased by 28.6%, Transitional Care Unit—restorative dining participation increased by 8%		
6. (Wilson et al., 2013)	None	Organiza-tional	One 637 bed tertiary care and commu-nity hospital in North-eastern U.S.	IV: CNL implementa-tion DV: Clinical outcomes	Several outcomes measure in several micro-systems based on CNL interventions	Clinical outcomes specific to micro-systems that CNLS work, financial data correlated with those outcomes	6 year role development of CNL role has positive outcomes related to such things as readmissions, LOS, pressure ulcers, patient education also quantified several of the CNL attributable financial outcomes with a savings of $2.5M+ for four CNL interventions	Level 5= Organi-zational Experience	A=High -longevity in implementing CNL role -good clinical outcomes in areas of interest -quantifying CNL led clinical outcomes with financial data
7. (Bender, William	None	Descriptive analysis of survey data	601 of 3375	IV: CNL year of experience as	Current demographics of CNLs	Online survey developed	32% of CNLs have 20+ years experience as	Level 3= Descriptive non-	A=High

s, & Su, 2016)			known CNLs	RN, specialty certification, graduate of model A or C program, practice setting, practicing in formal role DV: Updated demographics on CNL population and CNL population practicing in formal CNL role DV: CNL account-ability for essential competencies		as part of a larger mixed method study of CNL models of practice	RN, 75% have specialty certifications with 10% of those being in Med-Surg, 55.6% of respondents graduated from model A program, 71% practicing in formal CNL role, greatest growth of CNL infusion into practice is in the south, acute care hospitals are primary workplace for CNLs, growth rate of CNLs in practice 64% per year, CNLs in CNL role and alignment with essential competencies varying from 65.4%-90.2% use of competency in practice	experiment al	-CNL population growing -CNLs being used in CNL roles growing -valuable updated demographics on CNL population and those CNLs in formal CNL role -CNLs in CNL role and alignment with AACN essential competencies

8. (Harris & Ott, 2008)	None	Expert Opinion	N/A	N/A	N/A	N/A	Author recommen-dations for building a business case for CNL role including: relevant background information, problem/oppor-tunity statement, objectives, cost/benefit, pros and cons, alternatives and consequences	Level 5= expert opinion	A=High -clearly outlines categories of building a business case for implementing CNL role -gives some examples
9. (Clavo-Hall, Bender, & Harvath, 2018)	None	Narrative Literature Review	69 Articles	Articles describing roles of CNLs in actual practice settings	CNLs and the varying roles of current practice	Literature review summarize-ing current CNL roles and activities in varying practice settings	62% of CNLs are faculty, 12% are in clinical management or executive roles, 11% are specialty clinicians, and 9% are staff nurses	Level 5= Literature Review	A=High -Thorough literature review -CNLs still not typically in specifically defined CNL roles -Further research needed on CNL role integration

Appendix C

Evidence Synthesis Table

Intervention	1	2	3	4	5	6	7	8	9
Patient satisfaction	↑	↑	↑	NE	NE	NE	NE	NE	NE
Staff satisfaction/engagement with CNL role	↑	NE	NE	↑	NE	NE	NE	NE	NE
CNL satisfaction	NE	NE	NE	↑	NE	NE	NE	NE	NE
Physician satisfaction/engagement with CNL role	↑	NE	NE	↑	NE	NE	NE	NE	NE
Team communication and collaboration	↑	NE	NE	↑	↑	NE	NE	NE	NE
Patient specific positive outcomes	↑	NE	↑	NE	NE	NE	NE	NE	NE
Staff retention	↑	NE	NE	NE	NE	NE	NE	NE	NE
Patient clinical outcomes (examples: pain management, HAPU, falls, no-show rates for procedures)	↑	NE	NE	NE	↑	↑	NE	NE	NE
Length of stay	↑	NE	NE	NE	NE	NE	NE	NE	NE
Patient/family education	↑	NE	NE	NE	NE	↑	NE	NE	NE
Implementation and introduction of CNL role in organization	⇔	NE	NE	⇔	NE	NE	NE	NE	NE
CNL role/ CNL role sustainability	NE	NE	NE	⇔	NE	NE	NE	NE	⇔
Financial outcomes	NE	NE	NE	NE	NE	↑	NE	NE	NE
CNLs practical alignment with essential competencies	NE	NE	NE	NE	NE	NE	↑	NE	NE
Steps for building business case for CNL	NE	NE	NE	NE	NE	NE	NE	↑	NE

Appendix D

DNP Statement of Non-Research Determination Form

UNIVERSITY OF SAN FRANCISCO | School of Nursing and Health Professions

DNP Statement of Non-Research Determination Form

Student Name: Shelley Johnson

Title of Project:

Integrating Clinical Nurse Leaders (CNL) into Microsystems

Brief Description of Project:

A) Aim Statement: Hospital Acquired Infections (HAIs) of central line blood stream infections (CLABSIs), catheter associated urinary tract infections (CAUTIs) and Clostridium difficile will decrease by 20% in one year by integrating the CNL role into microsystems to focus on practices and processes to improve outcomes.

B) Description of Intervention: A clinical nurse leader (CNL) has training, skills, and competencies in clinical care, managing outcomes, patient advocacy, patient and staff education, managing information, and anticipating risk. These competencies are all extremely pertinent to address specific microsystem's healthcare acquired infection (HAI) reduction plans.

C) How will this intervention change practice? The CNL will focus on several process and practice measures to assess if policies, processes, and evidence-based practice (EBP) are actually being followed and performed as planned to affect the outcome measures. Based on those process and practice assessments, the CNL will develop interventions that would improve the related outcome measures.

D) Outcome measurements: The HAI rates and numbers, specifically catheter associated blood stream infections (CLABSIs), Catheter Associated Urinary Tract Infections (CAUTIs), and Clostridium difficile infections, are the outcomes measures for this project

To qualify as an Evidence-based Change in Practice Project, rather than a Research Project, the criteria outlined in federal guidelines will be used: (http://answers.hhs.gov/ohrp/categories/1569)

Appendix D (continued)

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☒ This project meets the guidelines for an Evidence-based Change in Practice Project as outlined in the Project Checklist (attached). Student may proceed with implementation.

☐This project involves research with human subjects and must be submitted for IRB approval before project activity can commence.

Comments:

EVIDENCE-BASED CHANGE OF PRACTICE PROJECT CHECKLIST *

Instructions: Answer YES or NO to each of the following statements:

Project Title:	**YES**	**NO**
The aim of the project is to improve the process or delivery of care with established/ accepted standards, or to implement evidence-based change. There is no intention of using the data for research purposes.	**X**	
The specific aim is to improve performance on a specific service or program and **is a part of usual care**. ALL participants will receive standard of care.	**X**	
The project is **NOT** designed to follow a research design, e.g., hypothesis testing or group comparison, randomization, control groups, prospective comparison groups, cross-sectional, case control). The project does **NOT** follow a protocol that overrides clinical decision-making.	**X**	
The project involves implementation of established and tested quality standards and/or systematic monitoring, assessment or evaluation of the organization to ensure that existing quality standards are being met. The project does **NOT** develop paradigms or untested methods or new untested standards.	**X**	
The project involves implementation of care practices and interventions that are consensus-based or evidence-based. The project does **NOT** seek to test an intervention that is beyond current science and experience.	**X**	
The project is conducted by staff where the project will take place and involves staff who are working at an agency that has an agreement with USF SONHP.	**X**	
The project has **NO** funding from federal agencies or research-focused organizations and is not receiving funding for implementation research.	**X**	
The agency or clinical practice unit agrees that this is a project that will be implemented to improve the process or delivery of care, i.e., **not** a personal research project that is dependent upon the voluntary participation of colleagues, students and/ or patients.	**X**	
If there is an intent to, or possibility of publishing your work, you and supervising faculty and the agency oversight committee are comfortable with the following statement in your methods section: *"This project was undertaken as an Evidence-based change of practice project at X hospital or agency and as such was not formally supervised by the Institutional Review Board."*	**X**	

ANSWER KEY: If the answer to **ALL** of these items is yes, the project can be considered an Evidence-based activity that does NOT meet the definition of research.

Appendix D (continued)

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IRB review is not required. Keep a copy of this checklist in your files. If the answer to ANY of these questions is NO, you must submit for IRB approval.

*Adapted with permission of Elizabeth L. Hohmann, MD, Director and Chair, Partners Human Research Committee, Partners Health System, Boston, MA.

STUDENT NAME (Please print): Shelley Johnson

Signature of Student: *Shelley Johnson*

DATE_11/8/2016

SUPERVISING FACULTY MEMBER (CHAIR) NAME (Please print):

Signature of Supervising Faculty Member (Chair):

_____Dr. Marjorie Barter_____DATE__11/9/16_____

Appendix E

Definition of Terms

Catheter Associated Urinary Tract Infection (CAUTI)—an infection of the urinary system associated with a urinary catheter. A urinary catheter is a tube inserted into the urinary tract to drain urine. Risk factors for CAUTI include not using sterile technique when inserting the catheter, not keeping the catheter and surrounding area clean, and prolonged use of the catheter (CDC Types of Healthcare-associated Infections, n.d.).

Central Line Associated Blood Stream Infection (CLABSI)—an infection of the bloodstream associated with a central line. A central line is a long-term tube inserted into a large vein to give medications or collect blood (CDC Types of Healthcare-associated Infections, n.d.).

Clinical Nurse Leader (CNL)—a registered nurse prepared at a master's degree level and nationally certified as a CNL. The CNL has competencies, training, and skills to influence quality improvement, process improvement, and safety outcomes for patients.

Clostridium Difficile (C. diff.)—a bacterium in the colon that can cause severe diarrhea and life-threatening inflammation of the colon (CDC Types of Healthcare-associated Infections, n.d.).

Hospital Acquired Infection (HAI)—infection associated with devices used in medical procedures or medical care (CDC Types of Healthcare-associated Infections, n.d.).

Appendix F

Project Letter of Support

NORTHBAY™ HEALTHCARE

November 8, 2016

University of San Francisco
School of Nursing and Health Professionals
2130 Fulton Street
San Francisco, CA 94117-5555

To Whom It May Concern:

I am writing to acknowledge support for Shelley Johnson in completion of her evidence based quality improvement DNP project, Integrating Clinical Nurse Leaders into Microsystems, in partial fulfillment of her Doctor of Nursing Practice degree in the Executive Leadership program at the University of San Francisco. The Vice President, Chief Nursing Officer will have an opportunity to review any manuscripts that identify NorthBay Healthcare Group submitted for publication prior to submission.

This letter also verifies that the NorthBay Healthcare Group has a memorandum of understanding with the School of Nursing and Health Professions at the University of San Francisco for student clinical course work that is supervised by USF faculty.

Sincerely,

Traci Duncan

Traci Duncan, DNP, RN, NEA-BC
Vice President, Chief Nursing Officer
NorthBay Healthcare Group

Compassionate Care,
Advanced Medicine,
Close to Home.

1200 B. Gale Wilson Blvd.
Fairfield, CA 94533-3587
ph (707) 646-5000

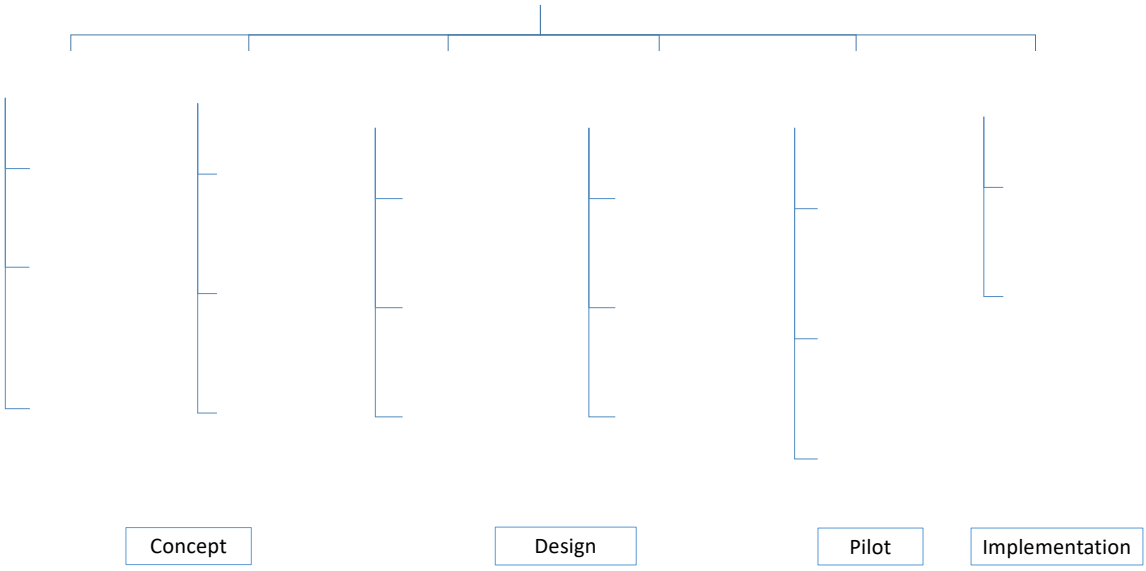
Appendix G

Stakeholder Analysis

Stakeholder	***C. diff***	**CAUTI**	**CLABSI**
Hospital Administration	X	X	X
Emergency Department	X	X	X
Acute Care	X	X	X
Intensive Care	X	X	X
Women's and Children's Health	X	X	X
Vascular Access	X	X	X
Perioperative Services	X	X	X
Cardiology and Cath Lab	X		X
Physicians/Providers	X	X	X
Clinical Nurse Specialists	X	X	X
Quality	X	X	X
Infection Prevention	X	X	X
Pharmacy	X		
Laboratory	X		
Radiology	X		
Supply Chain		X	X
Environmental Services	X		

Appendix H

Work Breakdown Structure



Appendix I

GANTT Chart

Shelley Johnson
June 2016

GANTT Chart

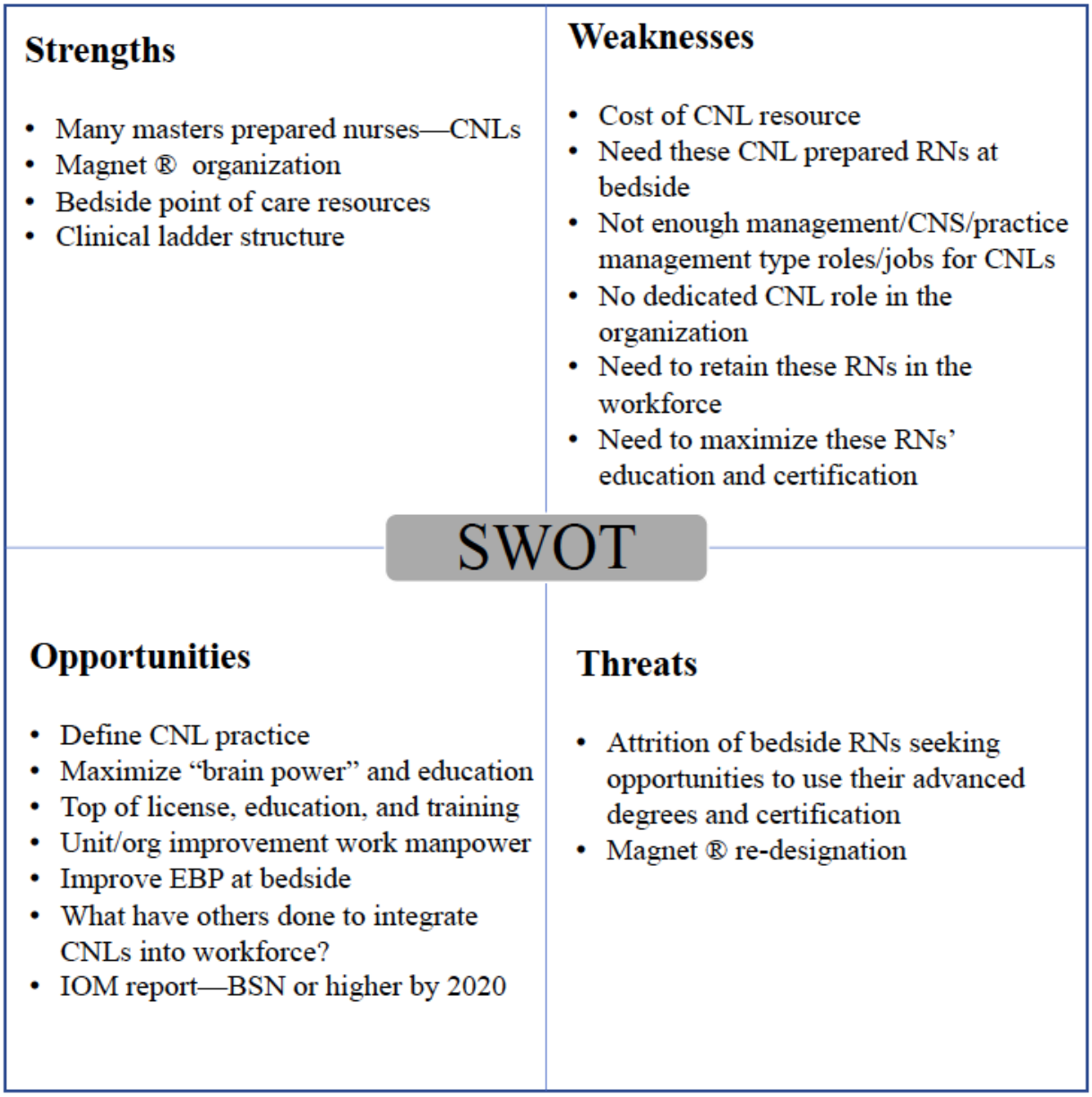
N738 Project Management
University of San Francisco

Complete	Clinical Nurse Leader Integration into Microsystems	2016 Sep	Oct	Nov	Dec	2017 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018 Jan	Feb	Mar	Apr	May
	Project concept																					
X	Review literature and EBP related to CNLs																					
X	Introduce project idea to direct leaders and peers																					
X	Project planning																					
X	Prepare business case																					
X	FTE request																					
X	Review data on nursing sensitive outcomes, current staff satisfaction, and current CNL satisfaction																					
X	Budget for pilot																					
	Design																					
X	Develop base job description/job duties of CNL on HAI team																					
X	Use shared governance structure to workflow specifics of daily job																					
X	Define outcomes measures																					
	Human Resources																					
X	Hold open forum sessions with current or soon to be CNLs																					
X	Identitify CNLs for HAI work team from each microsystem																					
X	Train selected candidates on selected foci for pilot																					
	Pilot																					
X	Open forums and pilot introduction with stakeholders: staff, managers, CNSs, others																					
X	Every other week check ins with CNLs and other staff to determine risks, benefits, barriers																					
X	Review outcomes, process, and practice metrics weekly																					
	Implementation																					
X	Review data to date for business planning and budgeting purposes																					
IP	Work with peers to develop rollout process to other microsystems--Prepare those microsystems																					

Complete	Clinical Nurse Leader Integration into Microsystems	2016 Sep	Oct	Nov	Dec	2017 Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	2018 Jan	Feb	Mar	Apr	May
	Evaluation																					
X	Process and practice measure monitoring (Formative)																					
X	Outcomes measure monitoring (Summative)																					

Appendix J

SWOT Analysis



Appendix K

Project Budget

Clinical Nurse Leaders--Pilot Project Budget	
REVENUE	
Cost avoidance (Based on goal of reducing the three HAIs by 20% in 2017 compared to 2016)	$168,416
Total budgeted revenue	**$168,416**
EXPENSES	
Salaries and Wages (includes benefits at 35%)	
Clinical Nurse Leader (1.0 FTE)	$205,000
Project Manager (Operational Director working on DNP project--5% of overall salary)	$10,500
Subtotal S/W	**$215,500**
Supplies Expense (laptop, desks, supplies, etc)	$10,000
Subtotal supplies	**$10,000**
Total expenses	**$225,500**
Total revenue or cost-avoidance– expenses (profit)	
	-$57,084

Notes: Nine CNLs are on HAI work group (2 ED, 1 ICU, 4 Med/Surg, 2 Women's and Children's Services). Their allotted time for meetings and work equates to an annualized 1.0 FTE.

National statistics from literature review informed the HAI cost avoidance figures.

At the end of the pilot, cost saved from 2016 versus 2017 HAIs, along with cost of CNLs on the work group will be used to develop business case for full rollout of CNLs in the organization.

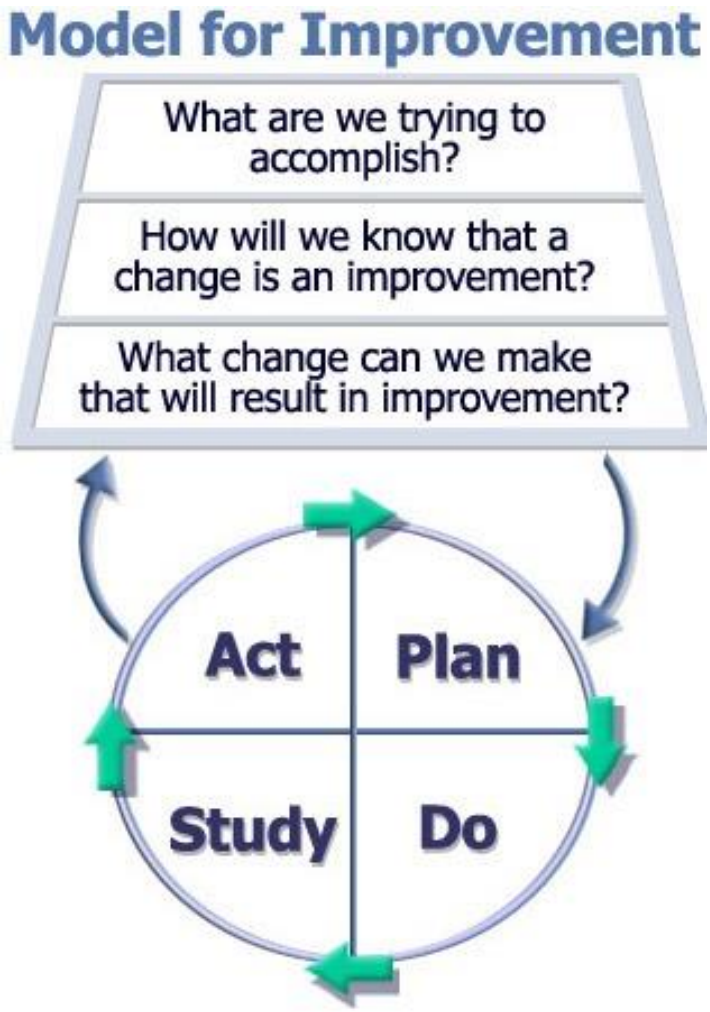
Appendix L

Data Reporting Matrix

Responsible Person/People	**Level of Data**	**Committee(s)**	**Interval**
DNP Student/Clinical Nursing Director and Quality Director	Outcomes data with benchmarks,	Infection Prevention and Quality Committees (Organization Level)	Quarterly
DNP Student/Clinical Nursing Director and Quality Director	Outcomes data with benchmarks, Overview of CNLs dashboards	HAI Improvement Steering Committee	Monthly
CNLs	CNL Dashboards	HAI Workgroup Meetings	Every two weeks
CNLs	Unit level quality boards	N/A	Daily/Weekly

Appendix M

Institute for Healthcare Improvement's Model for Improvement



Appendix N

Outcome, Process, and Practice Measures for CNLs to Address HAIs

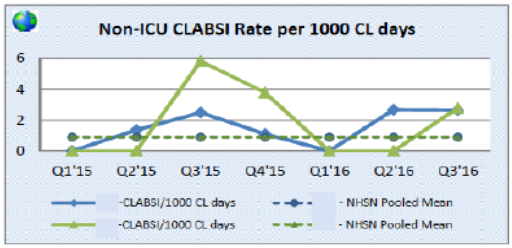
HAI	Outcomes	Process	Practice
CLABSIs	• Rates • Number • Benchmark	• Consistent use of EBP checklist for proper line insertion • Dressing changed on time or when soiled • Daily documentation of CHG bath • Line necessity documented daily	• RN speaks up when provider misses or doesn't do correctly per EBP checklist • Dressing changes done correctly? • CHG bath completed per protocol • Daily discussion of line necessity with provider
CAUTIs	• Rates • Number • Benchmark	• Catheter care documented daily • Daily documentation of CHG bath • Line necessity documented daily	• Proper sterile technique when inserting a catheter • CHG bath completed per protocol • Daily discussion of line necessity with provider
C. diff	• Rates • Number • Benchmark	• Handwashing rates by unit • Contact precautions documented • Patient/family/visitor education documented	• Handwashing compliance and technique • Proper contact precaution practice • RN provides thorough education to patient/ family/visitor

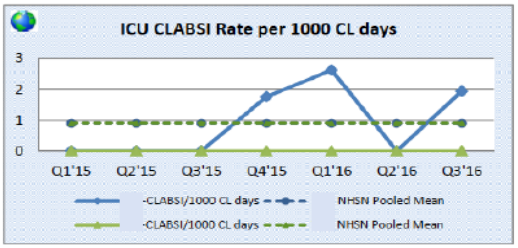
Note: CLABSI=central line associated blood stream infection, CAUTI=catheter associated urinary tract infection, C. diff=Clostridium difficile.

Appendix O

Sample Outcomes Data Display

INFECTION PREVENTION QUARTERLY REPORT
Central Line Associated Bloodstream Infections (CLABSI)
Quarter 3, 2016





CLABSI	2014	2015	2016	Q1 2016	Q2 2016	Q3 2016	Q4 2016
Non-ICU							
- # of CLABSIs	0	4	4	0	2	2	
- Central Line Days	2753	3163	2242	735	750	757	
- CLABSI Rate per 1000 Central Line days	0.0	1.3	1.8	0.0	2.7	2.6	
- NHSN Pooled Mean	1.4	0.9	0.9	0.9	0.9	0.9	
- # of CLABSIs	0	3	1	0	0	1	
- Central Line Days	994	1025	987	309	319	359	
- CLABSI Rate per 1000 Central Line days	0.0	2.9	1.0	0.0	0.0	2.8	
- NHSN Pooled Mean	1.4	0.9	0.9	0.9	0.9	0.9	
ICU							
- # of CLABSIs	2	1	3	2	0	1	
- Central Line Days	2119	2353	2012	765	729	518	
- CLABSI Rate per 1000 Central Line days	0.9	0.4	1.5	2.6	0.0	1.9	
- NHSN Pooled Mean	1.6	0.9	0.9	0.9	0.9	0.9	
- # of CLABSIs	1	0	0	0	0	0	
- Central Line Days	751	632	552	205	176	171	
- CLABSI Rate per 1000 Central Line days	1.3	0.0	0.0	0.0	0.0	0.0	
- NHSN Pooled Mean	1.2	0.9	0.9	0.9	0.9	0.9	
NICU	0.0	1.0	0.0	0	0	0	

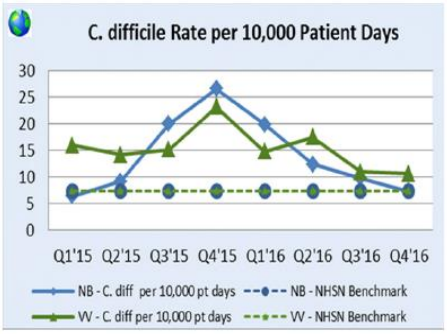
Analysis:
Four CLABSIs identified this quarter - 2 NB Medical Unit, 1 VV Medical Unit, and 1 NB ICU. The two on the NB Medical Unit involved same patient with a groshong catheter in place during July and September. Although catheter was replaced after 51 days with the first event, the subsequent groshong has an indwelling time of 63 days. The NB ICU CLABSI invloved a Power PICC with indwelling time of nine days.
The VV 1W CLABSI involved a PortaCath implanted in OR 6/16/16, no cultures were drawn from Port.
CHG bathing refused by patient on Medical Unit. CHG documentation not consistently documented on other CLABSIs captured.
Actions:
-All CLABSIs reported to Vascular Access Team (VAT) and manager/director of respective unit.
-RCAs completed on all CLABSIs with no recognizable causes determined.
-The PICC team continues to perform direct observation of all central lines to ensure compliance with maintenance and care. A risk identification report (RIR) is filed on all fallouts at the time of findings, which is sent to managers for corrective action.
-Continue monitoring and early communication of CLABSIs to nurse management team.
-Reinforce CHG bathing on all central lines and daily assessment for continued need.
- VAT has coordinated with Bard Access for presentation of current central line practices and training to optimize central line care thereby reducing CLABSI.

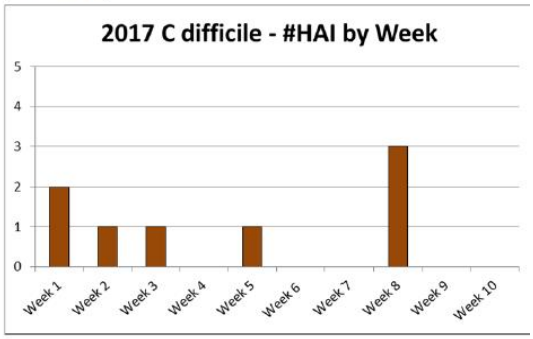
Note: Blue=larger hospital in organization, Green=smaller hospital in organization

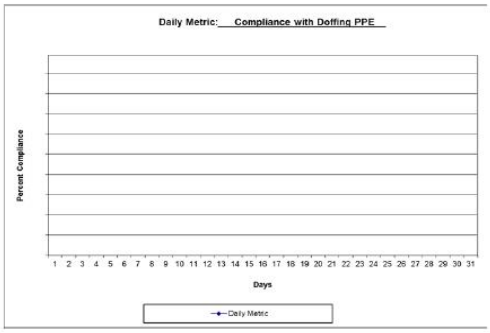
Appendix P

Quality Board Displays

C. diff







Standard Process for Doffing (Removing) PPE

Step	Action
1	Doff PPE at doorway
2 (A)	With gloved hands, grasp gown in front
3 (B)	Pull away from body so that ties break
4 (C)	When removing gown, fold or roll gown inside out into a bundle
5 (D)	While removing the gown, peel off gloves at the same time
6 (E)	Touch only the inside of the gloves and gown with bare hands
7	Discard both in receptacle immediately inside patient room.
8	Perform hand hygiene immediately

Centers for Disease Control and Prevention: Protecting healthcare personnel. (n.d.). Retrieved February 27, 2017, from https://www.cdc.gov/hai/prevent/ppe.html

C.diff HAI NB ICU 2/25/17- FIN 12617659

Situation: We had a hospital acquired *C. difficile* infection on 2/25/17 in the Nursery ICU. This patient has previously been on **multiple units** before being transferred to ICU and came in to contact with **multiple disciplines** during her stay.

Background:

2/19/17: This patient was brought in by ambulance to the VVED because she was found down at home by family. There was suspicion of a GI bleed because of blurff/H. She was started on protocle gtt, and admitted to 2 West.

2/14/17: Patient was started on a 7-day course of ampicillin for UTI. An EOD was performed, which was negative for active bleeding.

2/25/17: Early in the morning a code blue was called for a bradycardia, the patient was intubated and transferred to VVICU at 0430. Patient was then transferred to NBICU at 2128.

2/21/17: The patient was ordered and given a one time dose of bisacodyl (Dulcolax suppository) 10mg PR at 1028. At 1405 "medium, black, green, loose" stool documented. (Patient did not have any documented stools prior to this).

2/24/17: WBC increased to 21.24. There was a suspicion of possible PNA, but no additional antibiotics were ordered.

2/25/17: WBC 11.14. The next stool documented was at 1105 was "large, brown, and formed." At 1250 there was a "large, brown, loose" stool documented. *C. diff* PCR was ordered at 1319. The sample was collected at this time. Contact orders were placed and contact isolation was documented as initiated at 1341. At 1355 there was a "medium, brown, loose" stool documented. At 1443 the sample was reported as positive. The RN, MD, and infection control were notified appropriately.

Assessment: Stool was sent appropriately despite *C. difficile* specimen audit checklist not being utilized for this patient. This patient had contact with **multiple departments and disciplines** during hospitalization – **This is a call to action for all of us!** Risk factors included GI procedure, protocle, and antibiotic usage.

Recommendations:

Please remember to:

- **Doff PPE correctly**
- **Wash hands thoroughly**
- **Use single patient use items when available**
- **Clean multi-use items with bleach wipes using 2-step process**
- **Use the *C. difficile* specimen audit checklist**

Date	Improvement Ideas

Appendix Q

Sample Case Review of a Hospital Acquired CAUTI Incident

CAUTI—4/1/2017

Situation: There was a Catheter Associated Urinary Tract Infection (CAUTI) on 4/1/17. This is our 4th CAUTI in 2017.

Background: Patient is an 84 y.o. male with history of BPH, dementia, CVA, and UTI on admission. Admitted through the ED to hospital on 3/14/17.

3/14/17—Patient fell at home and fractured his hip. Foley cath placed in ED. Patient admitted to Med/Surg. No initial Foley catheter order entered in EHR (order on paper). Patient's UTI identified as ESBL E. coli on admission and was placed on isolation and seven-day treatment begun.

3/15/17—Patient to OR then to ICU post op. Order to d/c Foley on POD 2.

3/16/2017—Foley was not removed per physician order. CHG bathing not completed on this day.

3/17/2017—Patient cleared for weight bearing as tolerated with PT.

3/19/17—Patient transferred to Med/Surg.

3/23—RN completed the **d/c Foley** order from 3/15 in chart check, but the Foley remained in place.

During hospital course, patient's mobility was max assist, patient's health status declined and there was consideration of comfort care.

4/1—Patient febrile with blood and clots in urine. Catheter removed. Blood and urine cultures ordered and collected. Both resulted positive for Pseudomonas. Patient made comfort care.

Assessment:

Dwell time for the Foley catheter placed on admission was 19 days. This is a REALLY long time.

There was no electronic order for a Foley catheter on admission.

No electronic insertion order for a Foley catheter defeated all the safeguards imbedded in EHR to prevent a CAUTI. The major safeguard is a daily justification alert (with reason) for providers to document continued Foley use.

Recommendations:

- Ensure every indwelling Foley has an insertion order in the EHR.
- Inquire about continued Foley necessity every day.
- Review line necessity daily. Providers to complete justification alert with proper reason for continuation documented.
- CHG bathing to be completed daily on every ICU patient and every M/S patient with a Foley or central line.
- Complete and document Foley care daily and prn.
- Ensure Foley secured properly with securement device, tube not kinked, Foley bag in a dependent position--below level of bladder but not on the ground.

Appendix R

Workgroup Interventions

Issue	HAI Team Interventions	Type of Intervention
C. diff		
Stool collection criteria	Collection audit tool for front-line providers and staff to be completed before sending any stool specimen to lab. Revised audit tool based on staff feedback to increase clarity and ease of use. Educated staff on revisions.	Process
	Ensure staff complete audit tool prior to sending specimen	Practice
Hand washing	Standard work for hand washing	Process
	Reviewed at unit huddles	
	Staff return demonstration at staff meetings	Practice
	Created small poster depicting standard work of hand washing	
	Poster placed at every sink in the organization (staff and visitor)	Process
	Patient and visitor education sheet on proper hand washing technique	Process
	Invite visitors to wash their hands at nurses' station	Process
Doffing PPE	Standard work for doffing PPE	Process
	Reviewed at unit huddles	
	Staff return demonstration at staff meetings	Practice
	Created small poster depicting standard work of doffing PPE	Process
	Poster placed at doorway of every *C. diff*/contact isolation room	Process/Practice
	Patient and visitor education sheet on use of PPE and proper doffing	Process

Appendix R (Continued)

Workgroup Interventions

Issue	HAI Team Interventions	Type of Intervention
CAUTI		
Indwelling catheter insertion	Policy update to reflect current evidence based reasons for insertion	Process
	Add female urinals to all unit supply	Process
	Evaluate various catheter insertion kits and make recommendation to supply chain. Wrote business proposal supporting selected kit. New catheter kits approved. Worked with CNSs and incorporated indwelling catheter training with new kits into annual nursing skills fair.	Process
	Update provider order sets to **not** have urinary catheter pre-checked and add reasons for insertion to order	Process
	Start communication campaign to update staff on indwelling catheter current EBP (examples: do not inflate balloon prior to insertion, straight catheterization is potentially a better option than an indwelling for some patients). Present this information in unit huddles.	Process
	Training and return demonstration of all hospital nursing staff on indwelling catheter insertion during annual skills fair.	Practice

Appendix R (Continued)

Workgroup Interventions

Issue	HAI Team Interventions	Type of Intervention
CLABSI		
Insertion and maintenance	Partnering with central line and PICC vender to assess issues with CLABSI and develop interventions	Process/Practice
	Wrote business proposal supporting new central line and PICC line dressing change kits. New dressing change kits approved.	Process/Practice
	Organized staff champions who received super-user training from vender. Staff have trained all colleagues on new kits and standardized care and maintenance of central lines.	Process/Practice
	Vender reassessment of staff skills completed on December 4 & 5, 2017	Practice
Dissemination of Data		
Quality Boards and Huddles	Quality boards created to display data for each HAI	Process
	"Real time" case review of fallouts and near misses	Process
	Data and fallout information discussed at unit shift huddles	Process
	Improvement ideas solicited from front line staff	Process
	New quality boards designed, ordered, and hung for each department to help with standardizing the display of quality and improvement work. HAI team members are a primary point of contact for each department to help with HAI quality data display.	Process

Appendix S

C. diff Specimen Collection Audit Tool (front)

C. difficile Testing Audit Tool

If your patient has diarrhea (type 7 on the Bristol Stool Chart—see back), do the following:

- ☐ **Isolate (Initiate Contact *C. diff* Isolation and document initiated in EHR)**
- ☐ **Evaluate need for *C. diff* testing by using tool below**
- ☐ **Verify tool with Lead RN throughout the evaluation and prior to sending any specimen**

Step 1. Does the patient have a known history of *C. diff* in the past 90 days? *look within *Problems and Diagnosis* tab, as well as, verbal confirmation with the patient	☐ Yes—DO NOT SEND SPECIMEN	☐ No—Go to Step 2
Step 2. Has the patient been admitted for less than three calendar days? *admit day is day one	☐ Yes— Contact provider to order *C. diff* test SEND SPECIMEN	☐ No – Go to Step 3
Step 3. Does the patient have stool that meets the description of Bristol Chart* Type 7? *See Bristol Chart on back of form	☐ Yes—Go to Step 4	☐ No—DO NOT SEND SPECIMEN Contact provider to discontinue the *C. diff* isolation order
Step 4. Has the patient received a bowel prep, stool softeners, or laxatives in the last 48 hours? See list on reverse side	☐ Yes—DO NOT SEND SPECIMEN A. Discuss with provider to stop the laxative B. Date/Time of last dose _____ C. Reevaluate in 48 hours	☐ No—Go to Step 5
Step 5. Have there been 3 or more *consecutive*—Type 7 stools on Bristol Chart—in the past 24 hours?	☐ Yes— 1: Date_____ Time_____ 2: Date_____ Time_____ 3: Date_____ Time_____ SEND SPECIMEN	☐ No Consult provider to discuss clinical symptoms **AND** Evaluate necessity of C. diff test and continued isolation

RN Signature_____/ Lead Signature_____

Call 646-5014 between 8:00am-4:15pm, M-F to collaborate with IP for any questions. On weekends, holidays, and after hours you may contact IP via pager # 426-8586 (providing 7 digit call back number)

Date: Patient Label:

THIS NOT A PERMENANT CHART RECORD-WHEN DISCHARGED PLEASE REMOVE AND GIVE TO LEAD Revised 10/19/17

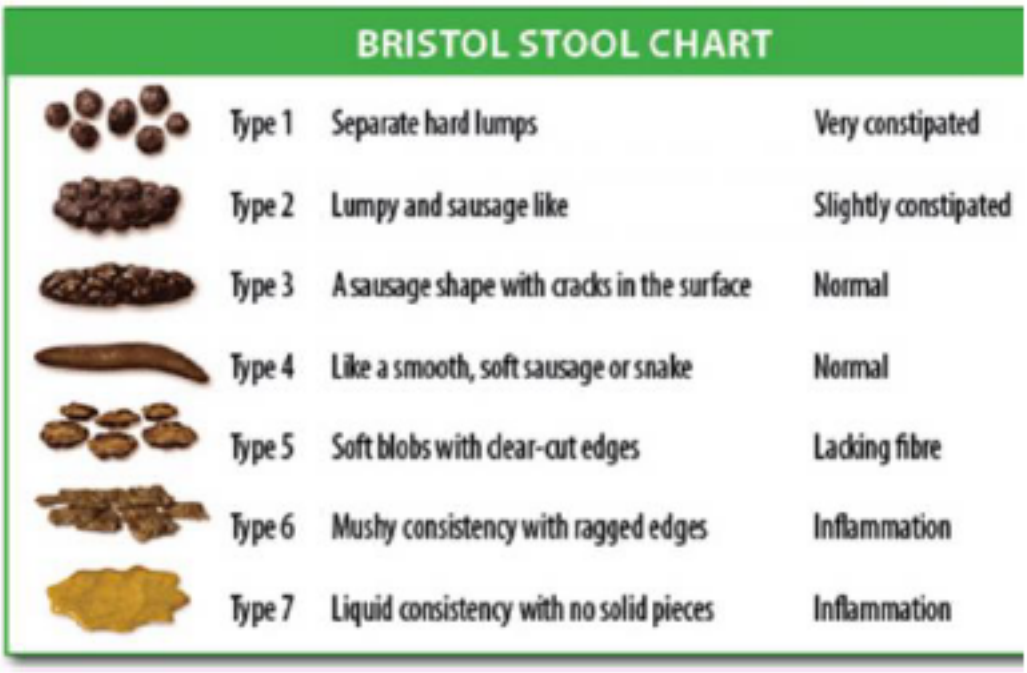
Appendix S (Continued)

C. diff Specimen Collection Audit Tool (back)

C. difficile Testing Audit Tool

Laxatives and Stool Softeners to consider discontinuing prior to sending a C.*diff* sample:

- Colace (Docusate sodium)
- Dulcolax (Bisacodyl)
- Miralax (Polyethylene Glycol)
- Generlac, Kristalose, Enulose, (Lactulose)
- Senokot, Ex Lax (Senna)
- Glycerol, Fleet Glycerin, Osmoglyn (Glycerin)
- Reglan, OMetozolv ODT (Metoclopramide)
- Milk of magnesium
- Citrate of Magnesia, Citroma, LiquiPrep (Magnesium citrate)
- Kayexalate (Sodium Polystyrene Sulfonate)
- Hemabate (Carboprost)



Appendix T

HAI Cost Avoidance 2017

HAI	Cost	2016 (Jan-Dec)	2016 YTD Cost	2017 (Jan-Dec)	2017 YTD Cost	2017 over 2016 Cost Avoidance
C. diff	$13,168	61	$803,248	33	$434,544	$368,704
CAUTI	$1,000	14	$14,000	9	$9,000	$5,000
CLABSI	$3,700	9	$33,300	6	$22,200	$11,100
Total		84	$850,548	48	$465,744	$384,804

Note: Cost of each HAI obtained from:

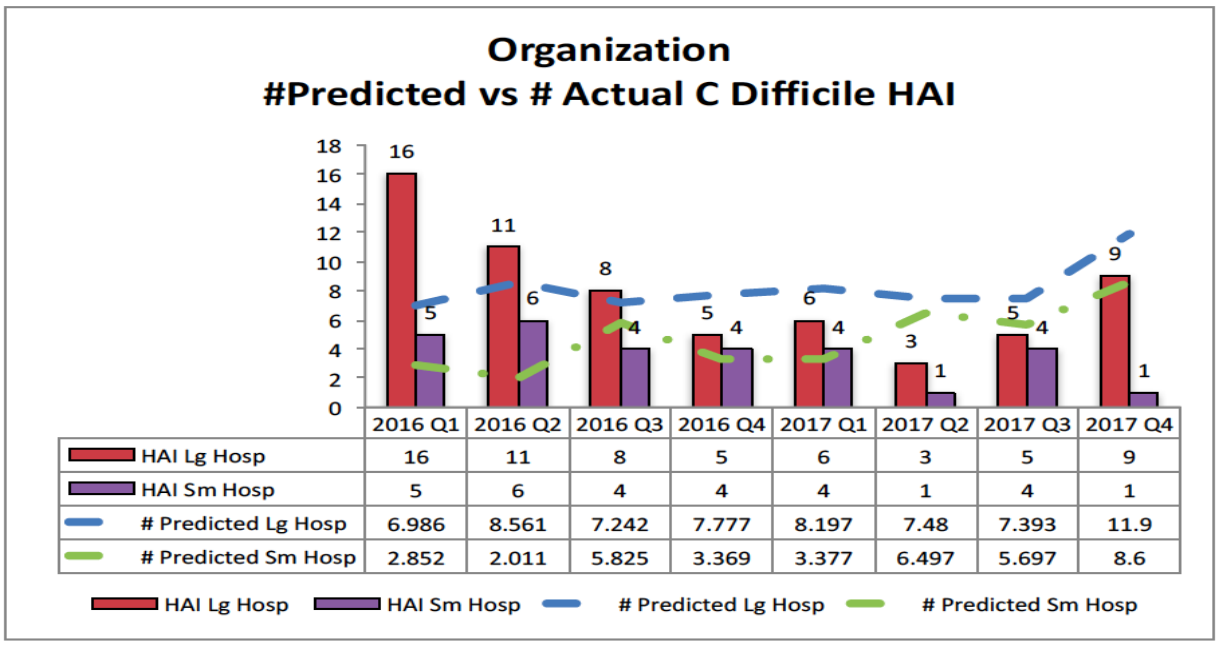
Institute for Healthcare Improvement: How to guide: Prevent catheter associated urinary tract infection. (2011). Retrieved from http:/www.ihi.org/resources/Pages/Tools/HowtoGuidePreventCatheterAssociatedUrinaryTractInfection.aspx

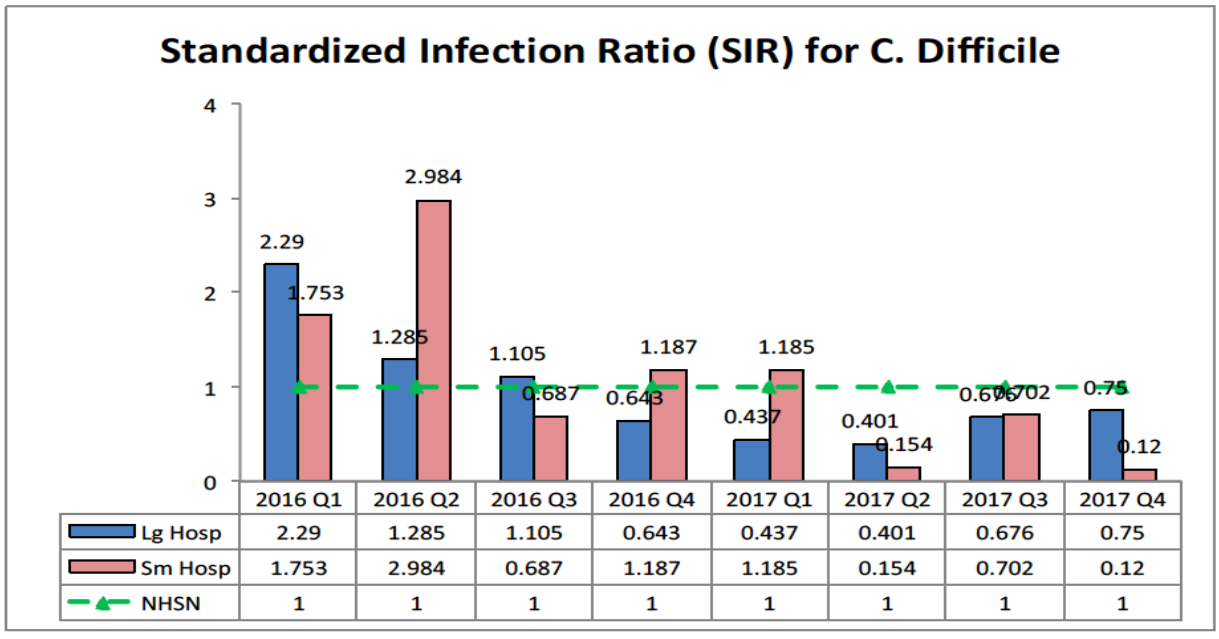
Institute for Healthcare Improvement: How to guide: Prevent central line associated bloodstream infection. (2012). Retrieved from http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventCentralLineAssociatedBloodstreamInfection.aspx

Shah, D. N., Aitken, S. L., Barragan, L. F., Bozorgui, S. Goddu, S., Navarro, M. E., … Garey, K. W. (2016). Economic burden of primary compared with recurrent *Clostridium difficile* infection in hospitalized patients: A prospective cohort study. *The Journal of Hospital Infection*, 93(3), 286-289. https://doi.org/10.1016/j.jhin.2016.04.004

Appendix U

Hospital Acquired C. diff Benchmarked Data





Note: Benchmarked predicted infections and standardized infection ratio (SIR) data from the National Healthcare Safety Network (NHSN), the public health surveillance system of the Centers for Disease Control (CDC)

Appendix V

CAUTI Prevention Huddle Message

SHARED MENTAL MODEL

~

Getting on the same page: priceless!

Please huddle with your team and assure that all receive this communication.

Huddle Guide # 214

Nursing Operations Council Approval Date: 6/26/17

Holy Foley!...I didn't know!
New Tools in the Toolkit
Volume 2

HUDDLE GUIDE # 214 **Date: 6/27/2017**

S: Our organization is on an upward trend of Hospital Acquired Infections (HAIs) since 2015 which is not in alignment with our goal of creating a trusting environment.

B: As of June 19th we have had 5 CAUTIs in 2017. Last year at this time, we had 4. This is an increase and is too high.

A: There are alternative urinary management tools that can be used rather than an indwelling urinary catheter.

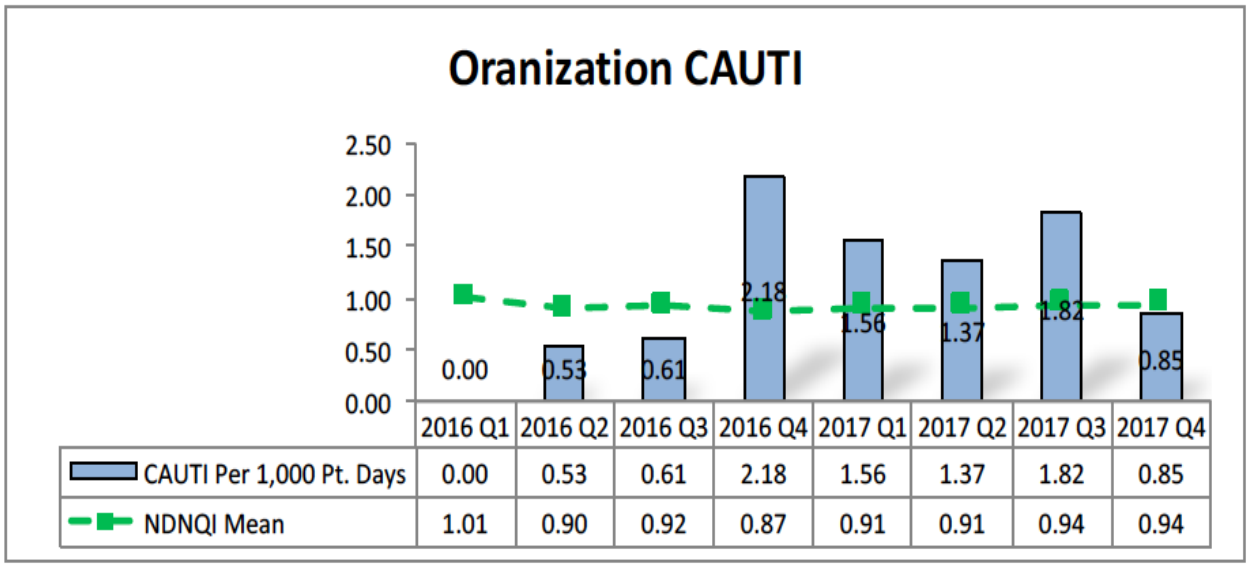
R: In and out straight caths—remember that evidence shows...

- **Straight catheterization for urinary retention poses LESS risk of infection than an indwelling catheter and should be considered before placing an indwelling.**
- **We also now have female urinals in hospital units.**
- **Female urinals are more expensive than male urinal so use them for females based on patients ' needs.**
- **They are a GREAT alternative to an indwelling catheter!!!**

Lippincott Advisor: Hospital-acquired conditions: Catheter-associated urinary tract infection.

Appendix W

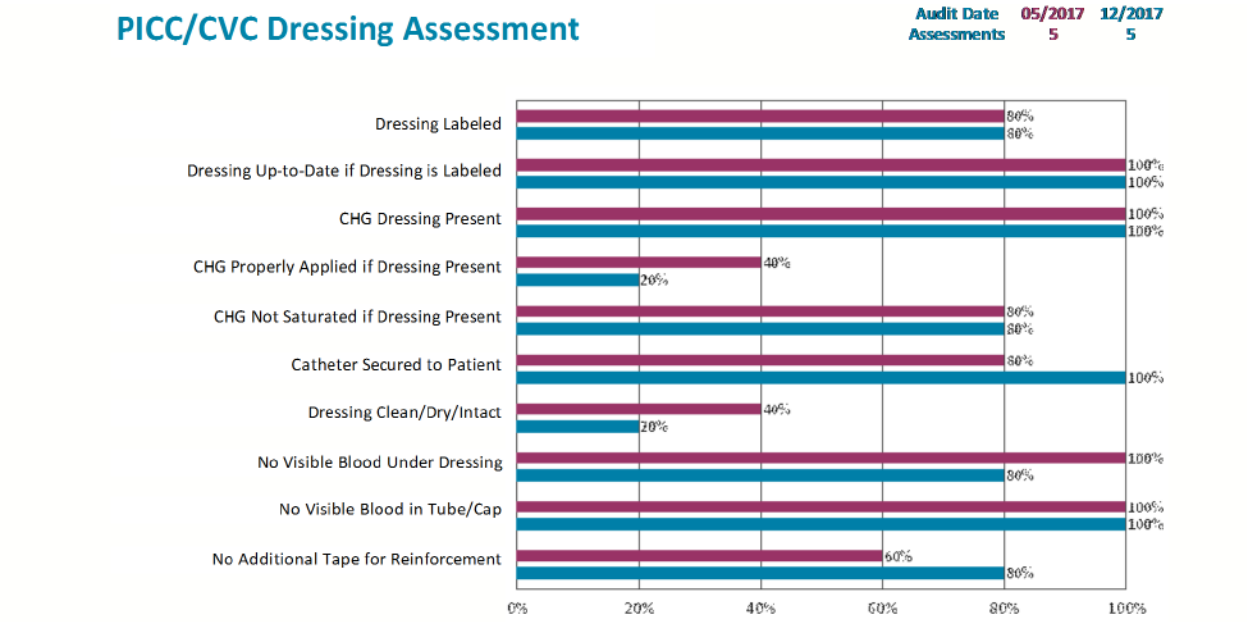
Hospital Acquired CAUTI Benchmarked Data



Note: Benchmarked data from the National Healthcare Safety Network (NHSN), the public health surveillance system of the Centers for Disease Control (CDC)

Appendix X

Larger Hospital CLABSI Assessment and Reassessment



Dressing Change Procedure

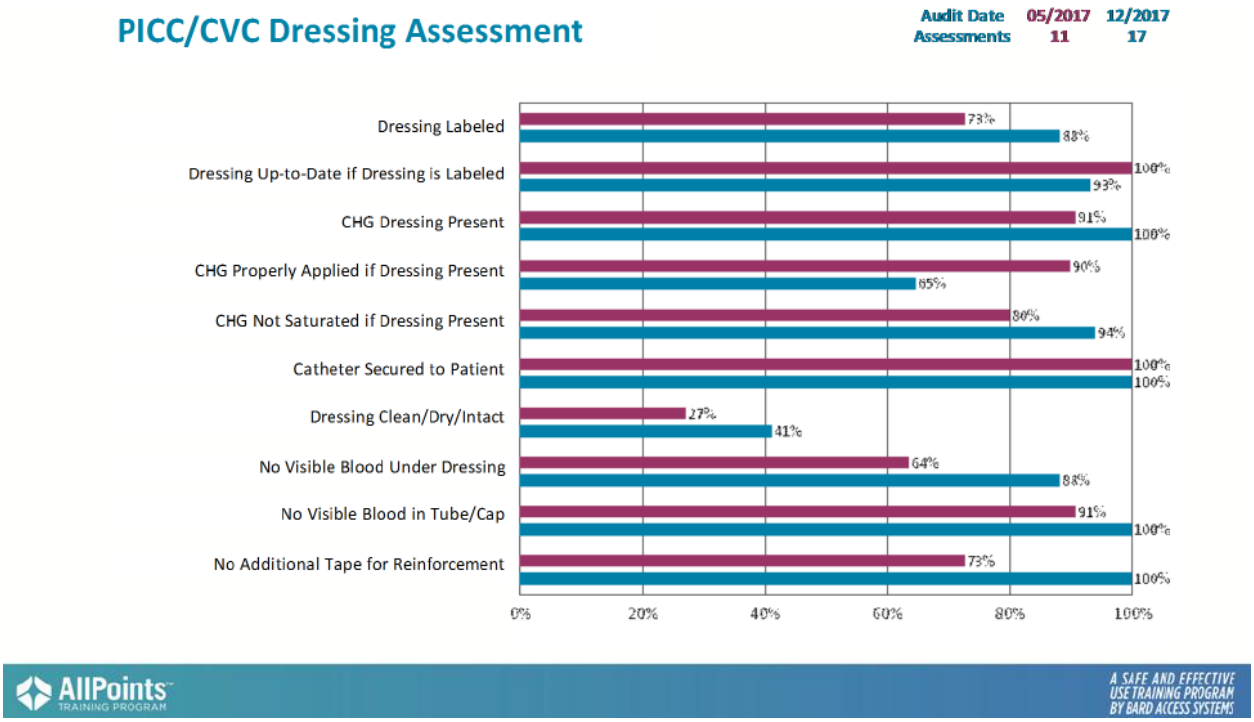
Audit Date	Hand hygiene	Dons clean gloves	Opens kit maintaining asepsis	Dons Mask	Removes dressing, pulling towards insertion site	Removes securement device
05/2017	83%	100%	67%	50%	50%	67%
12/2017	100%	100%	100%	100%	100%	100%

Audit Date	Discards soiled gloves	Hand hygiene	Dons sterile gloves aseptically	Cleanses skin using back and forth motion for 30 sec.	Allows to dry completely	Applies skin protectant
05/2017	83%	33%	33%	33%	67%	33%
12/2017	100%	100%	100%	80%	80%	100%

Audit Date	Applies securement device	Applies antimicrobial dressing	Apply dressing to cover securement device and bifurcation	Secures extension legs and lower dressing border	Labels dressing
05/2017	67%	67%	83%	33%	83%
12/2017	100%	80%	100%	60%	100%

Appendix Y

Smaller Hospital CLABSI Assessment and Reassessment



Dressing Change Procedure

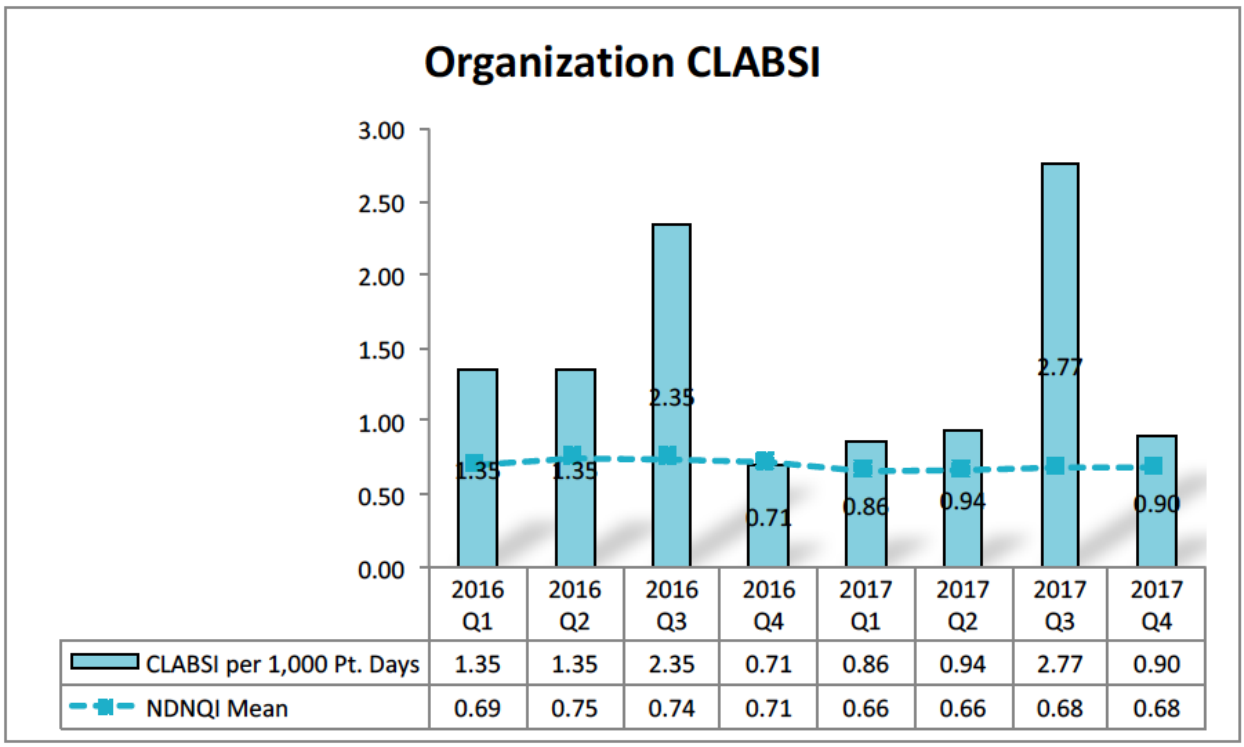
Audit Date	Hand hygiene	Dons clean gloves	Opens kit maintaining asepsis	Dons Mask	Removes dressing, pulling towards insertion site	Removes securement device
05/2017	100%	100%	100%	100%	0%	50%
12/2017	100%	100%	100%	75%	100%	50%

Audit Date	Discards soiled gloves	Hand hygiene	Dons sterile gloves aseptically	Cleanses skin using back and forth motion for 30 sec.	Allows to dry completely	Applies skin protectant
05/2017	75%	50%	100%	0%	25%	50%
12/2017	75%	75%	25%	75%	100%	75%

Audit Date	Applies securement device	Applies antimicrobial dressing	Apply dressing to cover securement device and bifurcation	Secures extension legs and lower dressing border	Labels dressing
05/2017	75%	50%	100%	25%	75%
12/2017	100%	100%	100%	100%	100%

Appendix Z

Hospital Acquired CLABSI Benchmarked Data



Note: Benchmarked data from the National Healthcare Safety Network (NHSN), the public health surveillance system of the Centers for Disease Control (CDC)

Appendix AA

CNL/HAI Workgroup Financial Impact and Return on Investment for the First Half of 2017

HAI	Cost	# of occurrences 2016 Jan-June	2016 YTD Cost	2017 Jan-Jun	2017 YTD Cost	2017 over 2016 Cost Avoidance
C. diff	$13,168	39	$513,552	15	$197,520	$316,032
CAUTI	$1,000	5	$5,000	6	$6,000	-$1,000
CLABSI	$3,700	4	$14,800	2	$7,400	$7,400
Total		48	$533,352	23	$210,920	$322,432

	Expenses Jan-Jun 2017	Cost Avoidance Jan-June 2017
Cost Avoidance of HAIs Jan-Jun		$322,432
Cost of Pilot HAI Workgroup (Jan-Jun CNL at 1.0 FTE at $73/hour plus 35% benefits)	$102,492	
	Net cost avoidance	$219,940

Note: The CNLs on the HAI workgroup are part-time clinical nurse staff who worked eight hours above their FTE during this pilot. They were not on overtime and they did not need to be replaced on the schedule.

Appendix AB

Three year CNL Business Plan

	Base year (Pilot)	Year 1	Year 2
Staffing Clinical Nurse Leaders	1.0 CNL	6.0 FTE**	6.0 FTE**
REVENUE			
Cost avoidance (annualized)	$646,000	$1,532,000***	$1,838,400****
Total revenue	**$646,000**	**$1,532,000**	**$1,838,400**
EXPENSES			
Salaries and Wages (includes benefits at 35%)			
Clinical Nurse Leader (wages annualized)	$205,000	$1,230,000	$1,266,900#
Project Manager (Operational Director working on DNP project to implement role--5% of overall salary in first year only)	$10,500		
Subtotal S/W	**$215,500**	$1,230,000	$1,2666,900
Supplies Expense (laptop, desks, supplies, etc.)##	$10,000	$60,000	$12,000
Subtotal supplies	**$10,000**	**$60,000**	**$12,000**
Total revenue/cost-avoidance	$646,000		
Total expenses	**$225,500**	**$1,290,000**	**$1,278,900**
Total revenue or cost-avoidance– expenses (profit)			
	$420,500	**$242,000**	**$559,500**

Notes: *Annualized cost avoidance of HAIs—base year focus for pilot CNLs

**6.0 FTE accounts for 1.0 FTE for each microsystem including critical care, three large acute care units, emergency department, and women and children services

***Cost avoidance assumed from continued 75% decrease in HAIs, a 50% reduction in falls, falls with injuries, HAPUs, and a 50% reduction in sitter use—all quality and patient safety issues that CNLs can impact.

****As above, but with another 20% of cost avoidance in all categories

#Assumes 3% annual wage adjustment for CNLs

##Laptop and desks are only year one (first CNL) and year two (five other CNLs) expenses